Public Works and Government Services Canada

E

Requisition No. EZ897-161994/A

MERX I.D. No. _____

SPECIFICATIONS
for

Parcel 44 Western Upland Portion Remediation

Esquimalt, BC

R.077391.002
Project No. November 2015

APPROVED BY:

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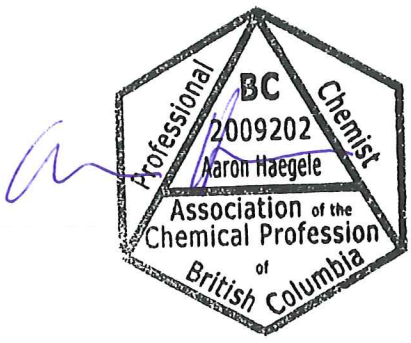


1.1 General Information

Public Works and Government Services Canada (PWGSC), on behalf of Transport Canada (TC), intends to remediate the western upland portion of the TC Parcel 44 site, located in Esquimalt, BC ('the site').

All work will be carried out under contract to PWGSC on behalf of TC. The PWGSC Departmental Representative will be responsible for approving the final extent of soils to be removed, their destination, monitoring remediation progress, and assuring quality of the work.

1.2 Introduction

The site is located in Esquimalt, BC, and comprises the upland and foreshore area in the northeast corner of Plumper Bay, Esquimalt Harbour, adjacent to the west side of the Trio Ready-Mix Ltd. concrete plant and the south side of the Esquimalt Indian Reserve (IR) (Drawings 1 and 2).

The central portion of the site is generally level with limited vegetation (e.g., grasses, small shrubs, blackberry). The ground surface slopes gradually downwards to the west and south toward Plumper Bay. The area adjacent to the foreshore is overgrown with blackberry and shrubs. The ground surface slopes steeply upwards to the east in the southeastern area of the site.

Fill material and debris (including metals, brick, and refuse) are present across the site. It is inferred that the current shoreline was created as a result of infilling of the foreshore areas in Plumper Bay between the late-1960s and the mid-1980s. The site has been used for a variety of industrial activities since that time.

A dilapidated wooden shed on skids, a vault constructed of concrete lock blocks, and a former creosote power poles are present on site as indicated Drawing 2. Several piles of mixed soil, logs, and brush (shrubs, blackberry bushes) from previous work are present on the surface of the site.

Previous site investigations have been conducted at the site and adjacent lands (including the Esquimalt IR) between 1992 and 2013, including an environmental issues inventory, limited Phase I Environmental Site Assessment (ESA), Phase II ESA, Phase III ESA, supplemental assessment of soil contamination, Preliminary Quantitative Risk Assessment (PQRA), and remediation planning. Partial remediation of the site was conducted in 2010 by SLR in conjunction with remediation of the adjacent Esquimalt IR (Drawing 3).

In 2014, SNC-Lavalin Inc. (SNC) prepared a report entitled "Data Gap Assessment, Remediation Cost Estimate, and NCSCS Scoring" (March 31, 2014) for four properties with fill on Esquimalt Harbour, including the site. Golder Associates (Golder) conducted a supplemental site assessment to investigate data gaps in 2015.

Soils containing metals, polycyclic aromatic hydrocarbon (PAH), and hydrocarbon concentrations exceeding the applicable CCME Commercial Land use (CL) guidelines were identified in-situ within the site.

TC wishes to transfer the site to the Esquimalt Nation, and requires remediation of the western upland portion of the site to meet CCME CL guidelines for this purpose. Additional remediation of the eastern upland portion of the site and the intertidal portion of the site will be conducted in the future under separate contract.

Remediation will consists of excavating approximately 1,800 m^3 of fill soils at the western upland portion of the TC Parcel 44 site as shown on Drawing 3, stockpiling excavated soils on site and on the adjacent EN site for characterization by the Departmental Representative, and off-site disposal of all soils exceeding CCME CL guidelines or not geotechnically suitable for re-use as backfill. Soils characterized as meeting the CCME RL guidelines and geotechnically suitable will be used as excavation backfill.

The following table summarizes the estimated soil volumes for off-site disposal and re-use on-site at the western upland portion of the Parcel 44 site:

Summary of Estimated Soil Volumes

Contamination Type	Estimated Volume (m^3)*	Estimated Contaminated Soil Tonnage For Off-Site Disposal (tonnes) **	Estimated Soil Tonnage For Re-Use On-Site (tonnes) **
Fill contaminated with metals (inc. Na/Cl) > CSR CL and PAHs / Hydrocarbons > CSR RL (Off-Site Disposal)	1,000	2,000	0
Fill contaminated with metals (inc. Na/Cl) and PAHs / Hydrocarbons > CSR RL and < CSR CL (Off-Site Disposal)	400	800	0
Fill contaminated with metals (inc. Na/Cl), PAHs, and Hydrocarbons < CSR RL and > CSR Schedule 7 (soil relocation to non-agricultural land) (Off-Site Disposal)	400	800	0
Fill characterized as meeting CCME RL guidelines and geotechnically suitable for re-use on-site	250	0	500
Excavate, segregate, transport to and from stockpile area, riprap and boulder fill for placement at the site perimeter	50	0	100
Total	2,100	3,600	600

* - actual volumes / tonnages will depend on ex-situ characterization

** - a conversion factor of 2.0 tonnes/m^3 was used

The work required under this contract covers remediation and restoration of the western upland portion of the site.

Access to the site is via Thomas Road from Admirals Road, through Modeste Road and the Trio Redi-Mix site (EN reserve private roads) to the eastern side of the site. The private roads, owned by EN, may require repair (such as filling and compacting road base gravel to existing grade) prior to remediation activities so that they are suitable for remediation activities (such as travel by heavy trucks). Repairs to the private roads owned by EN will be required to maintain the structure and appearance of the road to pre-excavation activities.

The upland western portion of Parcel 44 remediation involves excavation of approximately 1,800 m^3 of fill to a maximum depth of approximately 4 m below grade (mbg) and 210 m^3 of clean sand backfill material from the adjacent remediated sites. Approximately 50 m^3 of riprap/boulder fill material will be excavated, segregated, transported to and from the stockpile area for placement at the site perimeter. The proposed excavation area is shown on Drawing 3.

Metals and PAH concentrations are less than the BC Hazardous Waste Regulation standards.

The site is adjacent to Esquimalt Harbour, and in limited analysis the subsurface soils are impacted by sodium and chloride (Na/Cl) from tidal influx and / or placement of dredged material as fill at the site.

All excavated soil will be transported to one of the temporary stockpile locations on Esquimalt IR land adjacent to the site as shown on Drawing 2 for characterization by the Departmental Representative. Soil will be disposed of off-site based on the stockpile characterization data. Excavated soil that is characterized as meeting the CCME RL guidelines and is geotechnically suitable may be re-used as backfill.

Results of previous site investigations identified the potential presence of areas of archaeological significance. An archaeological monitor will be present (as required) during the excavation activities to assist in identifying the extent of these areas. The Departmental Representative will coordinate the archaeological monitoring. No excavation into areas identified as having archaeological significance will be allowed unless authorized by the Departmental Representative.

After remediation is complete, replacement fill will be required to restore the site to pre-excavation conditions. The final grade of the site will slope gently southwards towards Plumper Bay.

As directed by the Departmental Representative, the following soil types may be used as backfill for restoration of the area to pre-excavation conditions:

- Excavated soil that is characterized as meeting the CCME RL guidelines and is geotechnically suitable for use as backfill;
- Clean sand backfill material from the adjacent remediated sites excavated in order to access the contaminated soil; and
- Imported inorganic backfill that the Contractor must prove is free of contaminants in excess of CCME CL guidelines.

The Departmental Representative will provide direction on the final site reinstatement conditions.

Confirmatory samples will be collected by the Departmental Representative post-remediation to ensure that all contaminated soil has been removed. In the event contamination remains and additional soil is removed, the additional soil will be excavated and stockpiled to confirm classification/contaminant concentrations.

Erosion control measures will be implemented at the southern and western edges of the site adjacent to Plumper Bay.

The Contractor will be responsible for completing final as-built drawings for the remediation.

1.3 Work Covered By Contract Documents

.1 Work of this Contract comprises the following:

.1 Health and Safety Planning. Submit site-specific project Health and Safety Plan and emergency procedures to the Departmental Representative within 5 working days of award.

.2 The Environmental Protection Plan (EPP). The EPP is to present comprehensive overview of known or potential environmental issues, which must be addressed during construction. Submit EPP to the Departmental Representative within 5 working days of award.

.3 Although no underground utilities are anticipated, the Contractor will be responsible for locating all known and unknown buried services on and adjacent to the site. If required, the Contractor will be responsible for arranging with the appropriate authority for the relocation of buried services that interfere with execution of work and for paying all costs of relocating services.

.4 Installation and maintenance of temporary fencing around the active work site for duration of project, and at the upland boundary of the Parcel 44 site between the completion of remediation and February 29, 2016.

.5 Segregation, removal, and off-site disposal of vegetation at the portion of the site to be excavated (grasses, small shrubs, and blackberry), as well as several piles of mixed soil and brush from previous works that are located on the Parcel 44 site, but not within the proposed excavation area.

.6 Removal and off-site disposal of logs at the site surface and large woody debris segregated during excavation.

.7 Removal and off-site disposal of the wooden shed and debris contained within, one creosote power pole, and a metal tank (partially filled with water) at the site surface.

.8 Deconstruction of the concrete lock block vault and placement of the lock blocks at the site perimeter to restrict access as directed by the Departmental Representative.

.9 Repair and re-instate to their original condition any utilities encountered during the works. Contractor shall survey the location of maintained, re-routed and abandoned underground lines and include on final as-built drawing.

.10 Removal, temporary stockpiling, and re-use of clean sand backfill material from previous remediation on-site and on the adjacent Esquimalt Nation IR.

.11 Preparation of temporary stockpile location(s), including surfacing of access and haul roads if required.

.12 Excavation, loading, and stockpiling at the stockpile area of the contaminated fill material for characterization by the Departmental Representative.

.13 Excavation, segregation, transport to and from the stockpile area, riprap and boulder fill encountered for placement at the site perimeter to restrict access as directed by the Departmental Representative.

.14 Dewatering of excavation as necessary and storage, treatment, and discharge of treated water as determined by the Departmental Representative based on laboratory analytical results.

.15 Stockpiling of soils in approximately 50 m^3 piles, or pile sizes as directed by the Departmental Representative, in the designated area while awaiting characterization, and loading soil from stockpiles into trucks for off-site disposal.

.16 Allowing and assisting the Departmental Representative to collect soil samples from the excavations for characterization purposes to confirm that sufficient remediation has taken place.

.17 Loading, transport, and off-site disposal of the contaminated soils at Provincially Permitted and authorized off-site treatment or disposal facilities, based on the soil classification as defined by the Departmental Representative based on representative laboratory analysis.

.18 Provision, placement, grading, and compaction of backfill to restore the excavated area to pre-excavation conditions as outlined in Section 31 23 33.01 - Excavation, Trenching and Backfilling.

.19 Placement of a 12-mil HDPE liner along any excavation wall, the full depth of the excavation, where contamination remains but where the maximum extent of excavation has been reached.

.20 Maintaining erosion and sediment control at the site, including covering stockpiles, and appropriately managing any excavation water.

.21 Traffic control where required to maintain a safe work or traffic area for Esquimalt IR users.

1.4 Work by Others

.1 Co-operate with other Contractors in carrying out their respective works and carry out instructions from the Departmental Representative.

.2 Co-ordinate work with that of other Contractors. If any part of work under this Contract depends for its proper execution or result upon work of another Contractor, report promptly to Departmental Representative, in writing, any defects which may interfere with proper execution of work.

1.5 Work Sequence

.1 Conduct work in stages to accommodate continued use of Esquimalt IR facilities in immediate surrounding areas.

.2 Do not close off public usage of facilities until alternate usage has been provided.

.3 Maintain fire access/control.

1.6 Contractor Use of Premises

.1 The site is not an active facility.

.2 Co-ordinate use of premises under direction of Departmental Representative.

.3 Repair or replace portions of existing work which have been altered during construction operations to match existing or adjoining work, as directed by Departmental Representative.

.4 At completion of operations the condition of existing work must be equal to or better than that which existed before the new work started.

1.7 Owner Occupancy

.1 Co-operate with Departmental Representative in scheduling operations to minimize conflict and to facilitate Esquimalt Nation usage of adjacent Esquimalt IR land. In the event of a conflict the Contractor will accommodate changes to their operations to minimize interference with Esquimalt Nation operations.

1.8 Owner and Contractor Responsibilities

.1 Owner Responsibilities:

.1 Organize removal of materials including stockpiles of soil, brick, and gravel on the site; providing up-to-date utility location information to the Contractor, safety requirements, and any site specific work policies.

.2 Contractor Responsibilities:

.1 Designate submittals and delivery date for each product in progress schedule.

.2 Review all submittals and contract requirements. As soon as it becomes apparent, submit to Departmental Representative written and verbal notification of observed discrepancies or problems anticipated due to non-conformance with Contract Documents.

.3 Provide any installation inspections required by public authorities.

.4 Receive and unload products at site.

.5 Inspect deliveries jointly with Owner; record shortages, and damaged or defective items.

.6 Handle products at site, including uncrating and storage.

.7 Protect products from damage.

.8 Repair or replace items damaged by Contractor or subcontractor on site (under their control).

1.9 Alterations, Additions or Repairs

.1 Execute work with least possible interference or disturbance to existing Esquimalt Nation operations and normal use of Esquimalt IR premises. Arrange with Departmental Representative to facilitate execution of work.

1.10 Existing Services

.1 The Contractor is responsible for confirming locations of all utility lines within and immediately surrounding the work area. Drawing 3 shows the work area and proposed excavation limits.

.2 Notify Departmental Representative and utility companies of intended interruption of services and obtain required permission. If work requires breaking into or connecting to existing services, the Contractor will submit a request to the Departmental Representative a minimum of 48 hours prior to the event. The Contractor will not proceed until approval has been granted. The Departmental Representative will make every effort to accommodate the request; however, PWGSC will NOT accept delay charges should the request not be accepted.

.3 Minimize duration of interruptions, and where required, provide temporary services to maintain critical systems.

.4 During all site activities, roadways are to be provided and maintained for vehicular traffic, and access to Admirals Road, Hallowell Road and the private roads owned by EN is not to be obstructed at any time.

.5 Establish location and extent of service lines in area of work before starting Work. Notify Departmental Representative of findings.

.6 Submit schedule to and obtain approval from Departmental Representative for any shut-down or closure of active service or facility including power and communications services. Adhere to approved schedule and provide notice to affected parties.

.7 Provide adequate bridging over trenches to permit normal traffic.

.8 Where unknown services are encountered, immediately advise Departmental Representative and confirm findings in writing.

.9 Protect, relocate or maintain existing active services. When inactive services are encountered, cap off in manner approved by authorities having jurisdiction.

.10 Record locations of maintained, re-routed and abandoned service lines. The Contractor will be required to complete an as-built drawing upon project completion.

.11 Construct barriers in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.

1.11 Documents Required

.1 Maintain at job site, one copy each document as follows:

- .1 Utility Plans.
- .2 Contract Drawings.
- .3 Specification.
- .4 Addenda.
- .5 Reviewed Shop Drawings, if required.
- .6 List of Outstanding Shop Drawings, if required.
- .7 Change Orders.
- .8 Other Modifications to Contract.
- .9 Field Test Reports.
- .10 Copy of Approved Work Schedule.
- .11 Health and Safety Plan and Other Safety Related Documents.
- .12 Daily records of all material movement onto and off the site, including records (manifests) of waste movement and disposition, and analytical records as need be.
- .13 WorkSafeBC notice of project, also to be provided to the Departmental Representative prior to mobilization to the site.
- .14 Environmental Protection Plan.
- .15 Other documents as specified.

END OF SECTION

1.1 ACCESS AND EGRESS

.1 Design, construct and maintain temporary "access to" and "egress from" work areas, including stairs, runways, ramps or ladders and scaffolding, independent of finished surfaces and in accordance with relevant municipal, provincial and other regulations.

1.2 USE OF SITE AND FACILITIES

.1 Execute work with least possible interference or disturbance to normal use of premises by Esquimalt Nation. Make arrangements with Departmental Representative to facilitate work as stated.

.2 Where security is reduced by work provide temporary means to maintain security.

.3 Closures: protect work temporarily until permanent enclosures are completed.

1.3 EXISTING SERVICES

.1 Notify Departmental Representative and utility companies of intended interruption of services and obtain required permission.

.2 Where work involves breaking into or connecting to existing services, give Departmental Representative two working days of notice for necessary interruption of mechanical or electrical service throughout course of work. Keep duration of interruptions to a minimum. Carry out interruptions after normal working hours of occupants, preferably on weekends.

.3 Provide for personnel, pedestrian and vehicular traffic.

.4 Construct barriers in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.

.5 Existing groundwater monitoring wells outside the remediation area must be protected from damage and remain capped during all remediation activities. Groundwater monitoring well locations are shown on Drawing 3

1.4 SPECIAL REQUIREMENTS

.1 Carry out noise generating Work Monday to Friday from 07:00 am to 05:00 pm hours.

.2 All excavation and backfilling works need to be completed by February 29, 2016.

.3 Submit schedule in accordance with Section 01 32 16.07 - Construction Progress Schedules – Bar Chart.

.4 Ensure that Contractor personnel employed on site become familiar with and obey regulations including safety, fire, traffic and security regulations.

.5 Keep within limits of work and avenues of ingress and egress.

.6 The Contractor must take into account that the work will be conducted within an area that may contain archaeological deposits. Archaeological monitoring will be conducted as required during the project. No excavation into areas identified as having archaeological significance will be allowed unless authorized by the Departmental Representative.

.7 The Contractor shall allow for the temporary halting of excavation activities to allow the Consultant and/or an archaeological monitor access to the excavation to collect soil and/or material samples for further assessment of archaeological significance.

.8 The Archaeological monitor will be provided by the Departmental Representative.

END OF SECTION

1.1 ADMINISTRATIVE

.1 The Contractor will administer meetings.

.2 The Contractor will prepare the agenda for meetings.

.3 The Contractor will provide advance notice of each meeting two working days in advance of the meeting date.

.4 Contractor will record the meeting minutes, including significant proceedings and decisions, and identifying actions by parties.

.5 Contractor will reproduce and distribute copies of minutes within two working days after meetings and transmit to meeting participants.

.6 Representative of Contractor, Subcontractor and suppliers attending meetings will be qualified and authorized to act on behalf of party each represents.

1.2 PRECONSTRUCTION MEETING

.1 Within five working days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.

.2 Senior representatives from the Departmental Representative, Contractor, major Subcontractors, and field inspectors will be in attendance.

.3 Establish time and location of meeting and notify parties concerned minimum two working days before meeting.

.4 Incorporate mutually agreed variations to Contract Documents into Agreement, prior to signing.

.5 Agenda to include:

- .1 Appointment of official representative of participants in the Work.
- .2 Schedule of Work: in accordance with 01 32 16.07 - Construction Progress Schedules – Bar Chart.
- .3 Schedule of submission of shop drawings and samples. Submit submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .4 Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences in accordance with Section 01 52 00 - Construction Facilities.
- .5 Site security in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.
- .6 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.
- .7 Owner provided products.
- .8 Record drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .9 Take-over procedures, acceptance, warranties in accordance with Section 01 78 00 - Closeout Submittals .
- .10 Monthly progress claims, administrative procedures, photographs, hold backs.
- .11 Appointment of inspection and testing agencies or firms.
- .12 Traffic control as outlined in Section 01 35 00 06 – Special Procedures For Traffic Control.

.13 Environmental controls outlined in the Contractor's Environmental Protection Plan in accordance with Section 01 35 43 – Environmental Procedures.

1.3 PROGRESS MEETINGS

.1 During course of Work, schedule weekly progress meetings, or more frequently as required. A weekly progress meeting will be required, on site, to be attended by the Departmental Representative, the Contractor Project Manager and Contractor Field Supervisor and major subcontractors as a minimum.

.2 Notify parties minimum two working days prior to meetings.

.3 Contractor to record minutes of meetings and circulate to attending parties and affected parties not in attendance within two working days after meeting.

.4 Agenda to include the following:

.1 Review, approval of minutes of previous meeting.

.2 Review of Work progress since previous meeting.

.3 Field observations, problems, conflicts.

.4 Problems which impede the schedule.

.5 Corrective measures and procedures to regain projected schedule.

.6 Revision to the schedule.

.7 Progress schedule, during succeeding work period.

.8 Review submittal schedules: expedite as required.

.9 Health and Safety issues, including near misses.

.10 Environmental Protection Plan issues related to known or potential environmental issues.

.11 Maintenance of quality standards.

.12 Review of budget issues and change orders.

.13 Review proposed changes for affect on the schedule and on completion date.

.14 Other business.

END OF SECTION

1.1 DEFINITIONS

.1 Activity: element of Work performed during course of Project. Activity normally has expected duration, and expected cost and expected resource requirements. Activities can be subdivided into tasks.

.2 Bar Chart graphic display of schedule-related information. In typical bar chart, activities or other Project elements are listed down left side of chart, dates are shown across top, and activity durations are shown as date-placed horizontal bars. Generally Bar Chart should be derived from commercially available computerized project management system.

.3 Baseline: original approved plan (for project, work package, or activity), plus or minus approved scope changes.

.4 Construction Work Week: Monday to Friday, inclusive, will provide five day work week and define schedule calendar working days as part of Bar Chart submission.

.5 Duration: number of work periods (not including holidays or other nonworking periods) required to complete activity or other project element. Usually expressed as workdays or workweeks.

.6 Milestone: significant event in project, usually completion of major deliverable.

.7 Project Schedule: planned dates for performing activities and the planned dates for meeting milestones. Dynamic, detailed record of tasks or activities that must be accomplished to satisfy Project objectives. Monitoring and control process involves using Project Schedule in executing and controlling activities and is used as basis for decision making throughout project life cycle.

1.2 REQUIREMENTS

.1 Ensure detail schedules are practical and remain within specified Contract duration.

.2 Plan to complete Work in accordance with prescribed milestones and time frame.

.3 Limit activity durations to maximum of approximately 14 working days, to allow for progress reporting.

.4 Ensure that it is understood that Award of Contract or time of beginning, rate of progress, and defined completion date are of essence of this contract.

1.3 SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit Project Schedule to the Departmental Representative within 3 working days of award.

.3 Submit site-specific project Health and Safety Plan and emergency procedures to the Departmental representative within 5 working days of award.

.4 Submit Environmental Protection Plan to the Departmental Representative within 5 working days of award.

1.4 PROJECT SCHEDULE

.1 Develop detailed Project Schedule.

.2 Ensure detailed Project Schedule includes as minimum milestone and activity types as follows:

.1 Health and Safety Plan submittal.

.2 Environmental Protection Plan submittal.

.3 All Permits.

.4 Utility Locate.

.5 Shop Drawings, Samples.

.6 Mobilization.

.7 Submission of backfill analytical to ensure compliance with CCME Commercial Land Usage Guidelines. Sufficient sample data must be provided to adequately characterize the imported fill. (i.e. in accordance with BC MOE Guidance Document #1 - Site Characterization and Confirmatory Testing).

.8 Excavation completion date.

.9 Backfill completion date.

.10 As-built survey dates.

.11 Delivery of supporting documentation to Departmental Representative.

.12 Project completion date.

1.5 PROJECT SCHEDULE REPORTING

.1 Update Project Schedule on weekly basis reflecting activity changes and completions, as well as activities in progress.

.2 Include as part of Project Schedule, narrative report identifying Work status to date, comparing current progress to baseline, presenting current forecasts, defining problem areas, anticipated delays and impact with possible mitigation.

1.6 PROJECT MEETINGS

.1 Discuss Project Schedule at regular site meetings (weekly, or more frequently as required), identify activities that are behind schedule and provide measures to regain slippage. Activities considered behind schedule are those with projected start or completion dates later than current approved dates shown on baseline schedule.

END OF SECTION

1.1 ADMINISTRATIVE

.1 Submit to Departmental Representative submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.

.2 Do not proceed with Work affected by submittal until review is complete unless directed to do so by the Departmental Representative.

.3 Present shop drawings, product data, samples and mock-ups in SI Metric units. Where items or information is not produced in SI Metric units converted values are acceptable.

.4 Review submittals prior to submission to Departmental Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-ordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.

.5 Notify Departmental Representative, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.

.6 Verify field measurements and affected adjacent Work are co-ordinated.

.7 Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative review of submittals.

.8 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative.

.9 Keep one reviewed copy of each submission on site.

1.2 MANIFESTS

.1 A copy of all manifests and/or truck weigh scale documents for material brought onto or removed from the site are to be provided to the Departmental Representative.

1.3 SUBMITTAL SUMMARY

.1 Submittals are summarized in following Table. It is the Contractor’s responsibility to provide all submittals as listed in the Specification sections.

Submittal Summary

Submittal	Specification Section(s)	Submission Schedule
Proposed project schedule	01 32 16.07	Within 3 working days of award
Disposal documentation for waste removed from site, daily log sheets of transported materials, weekly worker and visitor access log books.	01 35 13.43	Daily, or as requested by the Departmental Representative
Prepare site plan indicating the proposed route of the temporary fencing.	01 52 00	Within 5 working days of award
Site layout drawings	01 35 13.43 31 23 33.01	Within 5 working days of award

Submittal	Specification Section(s)	Submission Schedule
Health and Safety Plan, inspection reports, previous incident reports, MSDS and WHMIS documents, and emergency procedures	01 35 29.06	Within 5 working days of award
Proof of good standing With WorkSafe BC and copy of WorkSafe BC Notice of Project	01 35 29.06	Prior to start of work
Environmental Protection Plan	01 35 43	Within 5 working days of award
Backfill analytical documentation	01 35 43	Prior to import of any backfill material
Final survey	01 78 00	At completion of project
Identify subcontractors and provide evidence of licensing to transport Hazardous Waste (if required)	02 61 00.01	Within 5 working days of award
Identify disposal facilities and provide evidence they can dispose of each category of material	02 61 00.01	Within 5 working days of award
Excavation design	31 23 33.01	A minimum of 5 working days before beginning work

END OF SECTION

1.1 REFERENCES (Latest Version)

.1 Manual of Uniform Traffic Control Devices (MUTCD) published by Transport Canada.

1.2 PROTECTION AND MAINTENANCE OF TRAFFIC

.1 Comply with requirements of Acts, Regulations and By-Laws in force for regulation of traffic or use of roadways upon or over which it is necessary to carry out Work or haul materials or equipment.

.2 Protect travelling public from damage to person and property.

.3 Maintain and protect traffic on affected roads during construction period except as otherwise specifically directed Departmental Representative. At minimum one lane must be kept open for traffic flow at all times.

.4 When working on travelled way:

- .1 Place equipment in position to present minimum of interference and hazard to travelling public.
- .2 Keep equipment units as close together as working conditions permit and preferably on same side of travelled way.
- .3 Do not leave equipment on travelled way overnight.

.5 Do not close any lanes of a road without approval of the Department Representative. Before re-routing traffic erect suitable signs and devices in accordance with instructions contained in Part D of MUTCD.

.6 Keep travelled way, including Thomas Road through Modeste Road and the Trio Redi-Mix site, graded, free of potholes and of sufficient width for required number of lanes of traffic.

.7 Access to the site is via Thomas Road from Admirals Road, through Modeste Road and the Trio Redi-Mix site (EN reserve private roads) to the eastern side of the site. The private roads, owned by EN, may require repair (such as filling and compacting road base gravel to existing grade) prior to remediation activities so that they are suitable for remediation activities (such as travel by heavy trucks). Repairs to the private roads owned by EN will be required to maintain the structure and appearance of the road to pre-excavation activities.

.8 As part of the site remediation activities, the Contractor must ensure that all roadways remain in a fully functional state, unless suitable temporary alternatives are agreed to in writing by EN.

.9 Upon completion of the work, the Contractor must, to the satisfaction of EN, reinstate all roads and all areas traversed by temporary roads used to mobilize equipment and/or to transport material, to their initial condition or better.

.10 Contractor's traffic on roads selected for hauling material to and from site to interfere as little as possible with public and Esquimalt Nation traffic.

.11 Traffic routes must be maintained at all times during the completion of the project Work. The Contractor shall provide access and temporary relocated roads as necessary to maintain traffic.

.12 Verify adequacy of existing roads and allowable load limit on these roads. Contractor: responsible for repair of damage to roads caused by construction operations.

.13 Maintain access and haul roads as necessary, including the road to and around the temporary stockpile locations.

.14 Haul roads: constructed with suitable grades and widths; sharp curves, blind corners, and dangerous cross traffic shall be avoided.

.15 Provide necessary lighting, signs, barricades, and distinctive markings for safe movement of traffic.

.16 Lighting: to assure full and clear visibility during night work operations.

.17 Dust control: adequate to ensure safe operation at all times.

.18 Location, grade, width, and alignment of construction and hauling roads: subject to approval by the Departmental Representative.

.19 Provide snow removal during period of work, if required.

.20 Remove, upon completion of work, any access and haul roads.

1.3 INFORMATIONAL AND WARNING DEVICES

.1 Provide and maintain signs, flashing warning lights and other devices required to indicate construction activities or other temporary and unusual conditions resulting from Project Work which requires road user response.

.2 Supply and erect signs, delineators, barricades and miscellaneous warning devices as specified in Part D, Temporary Conditions Signs and Devices, of MUTCD.

.3 Place signs and other devices in locations recommended in MUTCD.

.4 Meet with the Departmental Representative prior to commencement of Work to prepare list of signs and other devices required for project. If the situation on site changes revise list to the approval of the Departmental Representative.

.5 Continually maintain traffic control devices in use by:

.1 Checking signs daily for legibility, damage, suitability and location. Clean, repair or replace to ensure clarity and reflectance.

.2 Removing or covering signs which do not apply to conditions existing from day to day.

1.4 CONTROL OF PUBLIC TRAFFIC

.1 Provide competent flag persons, trained in accordance with, and properly equipped as specified in, MUTCD in following situations:

.1 For trucks turning onto Admirals Road from Thomas Road when leaving the site (loaded or empty).

.2 When public traffic is required to pass working vehicles or equipment that block all or part of travelled roadway.

.3 When it is necessary to institute one-way traffic system through construction area or other blockage where traffic volumes are heavy, approach speeds are high and traffic signal system is not in use.

.4 When workmen or equipment are employed on travelled way over brow of hills, around sharp curves or at other locations where oncoming traffic would not otherwise have adequate warning.

.5 Where temporary protection is required while other traffic control devices are being erected or taken down.

.6 For emergency protection when other traffic control devices are not readily available.

.7 In situations where complete protection for workers, working equipment and public traffic is not provided by other traffic control devices.

.8 Delays to public traffic due to Contractor's operators: maximum 15 minutes.

.2 Where roadway, carrying two-way traffic, is restricted to one lane, for 24 hours each day, provide portable traffic signal system. Adjust, as necessary, and regularly maintain system during period of restriction. Signal system to meet requirements of Part IV of MUTCD.

1.5 OPERATIONAL REQUIREMENTS

.1 Maintain existing conditions for traffic throughout period of contract except that, when required for construction under contract and when measures have been taken as specified and approved by Departmental Representative to protect and control public traffic.

.2 Maintain existing conditions for traffic crossing right-of-way.

END OF SECTION

1.1 RELATED SECTIONS

.1 Section 31 23 33 01 – Excavation, Trenching and Backfilling

.2 Section 02 61 00 01 – Soil Remediation

1.2 REFERENCES (Latest Edition)

.1 Canadian General Standards Board (CGSB)

.1 CGSB 51-GP-51M-[81], Polyethylene Sheet for Use in Building Construction.

.2 Transportation and Dangerous Goods Act

.3 Canadian Council of Ministers of the Environment (CCME) Documentation

1.3 SUBMITTALS

.1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit.

.1 Copies of transport manifests, trip tickets, and disposal receipts for waste materials removed from work area.

.2 Daily log sheets of transported materials.

.3 Weekly copies of site entry and work area logbooks with information on worker and visitor access.

.4 Other information required by Departmental Representative for progress meetings.

.3 Within 5 working days after date of award and prior to mobilization to site, submit site layout drawings showing existing conditions and facilities, construction facilities and temporary controls provided by Contractor including following:

.1 Equipment and personnel decontamination areas.

.2 Means of ingress, egress and temporary traffic control facilities.

.3 Equipment and material staging areas.

.4 Exclusion Zones, Contaminant Reduction Zones, and other zones specified in Contractor's site-specific Health and Safety Plan.

.5 Wastewater treatment facilities and wastewater storage tanks location.

1.4 VEHICULAR ACCESS AND PARKING

.1 Maintenance and Use:

.1 Prevent contamination of site roads. Immediately scrape up debris or material on access roads which is suspected to be contaminated as directed by the Departmental Representative and transport and place into the approved soil stockpile area. Clean all access and transport roads at least once per shift, including to and from site and to and from site to temporary stockpile area.

1.5 DUST AND PARTICULATE CONTROL

.1 Execute Work by methods to minimize raising dust from construction operations.

.2 Implement and maintain dust and particulate control measures as directed by the Departmental Representative.

.3 As minimum, use appropriate covers on trucks hauling fine or dusty material. Use watertight vehicles to haul wet materials.

.4 Prevent dust from spreading to adjacent property sites.

.5 The Departmental Representative will stop work at any time when Contractor's control of dusts and particulates is inadequate for wind conditions present at site, or when air quality monitoring indicates that release of fugitive dusts and particulates into atmosphere equals or exceeds specified levels.

.6 If Contractor's dust and particulate control is not sufficient for controlling dusts and particulates into atmosphere, stop work. Contractor must discuss procedures that Contractor proposes to resolve problem. Make necessary changes to operations prior to resuming excavation, handling, processing, or other work that may cause release of dusts or particulates.

1.6 POLLUTION CONTROL

.1 Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious toxic substances and pollutants produced by construction operations.

.2 Be prepared to intercept, clean up, and dispose of spills or releases that may occur whether on land or water. Maintain materials and equipment required for cleanup of spills or releases readily accessible on site.

.3 Contact manufacturer of pollutant if known and ascertain hazards involved, precautions required, and measures used in cleanup or mitigating action.

.4 Take immediate action using available resources to contain and mitigate effects on environment and persons from spill or release.

.5 Provide spill response materials including, containers, adsorbent material, shovels, and personal protective equipment. Make spill response materials available at all times in which hazardous materials or wastes are being handled or transported. Spill response materials: compatible with type of material being handled.

1.7 EQUIPMENT DECONTAMINATION FACILITY

.1 Commence Work involving equipment contact with potentially contaminated material only after Equipment Decontamination Facility is operational, or as approved by the Departmental Representative.

.2 Decontaminate equipment after working in potentially contaminated work areas and prior to subsequent work or travel on clean areas.

.3 Perform equipment decontamination in area where any runoff or impacted material can be contained and collected for treatment or disposal.

.4 At minimum, perform following steps during equipment decontamination: mechanically remove packed dirt, grit, and debris by scraping and brushing without using steam or high-pressure water to reduce amount of water needed and to reduce amount of contaminated rinsate generated. Pay particular attention to tire treads, equipment tracks, springs, joints, sprockets, and undercarriages. Scrub surfaces with long handle scrub brushes and cleaning agent. Rinse off and collect cleaning agent.

.5 Take appropriate measures necessary to minimize drift of mist and spray during decontamination including provision of wind screens.

.6 Collect decontamination wastewaters and sediments which accumulate on equipment decontamination pad. Transfer wastewaters to designated wastewater storage tank.

.7 Transfer sediments to soil stockpile area.

1.8 FINAL DECONTAMINATION

.1 Perform final decontamination of construction facilities, equipment, and materials which may have come in contact with potentially contaminated materials prior to removal from site.

1.9 REMOVAL AND DISPOSAL

.1 Remove surplus materials and temporary facilities from site as outlined in Section 01 35 43 – Environmental Procedures and Section 31 23 33.01 – Excavation, Trenching, and Backfilling.

.2 Dispose of non-contaminated waste materials, litter, debris, and rubbish off site.

.3 Do not burn or bury rubbish and waste materials on site.

.4 Do not dispose of volatile or hazardous wastes such as mineral spirits, oil, or paint thinner in storm or sanitary drains.

.5 Do not discharge wastes into streams or waterways.

.6 Dispose of following materials at appropriate off-site facility identified by Contractor and approved by the Departmental Representative:

.1 Debris including excess construction material.

.2 Non-contaminated litter and rubbish.

.3 Disposable PPE worn during final cleaning.

.4 Wastewater removed from wastewater storage tank.

.5 Wastewater generated from final decontamination operations including wastewater storage tank cleaning.

END OF SECTION

Part 1 PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 01 33 00 – Submittal Procedures.

.2 Section 01 35 00.06 – Special Procedures for Traffic Control.

1.2 REFERENCES

.1 Government of Canada

.1 Canada Labour Code – Part II

.2 Canada Occupational Health and Safety Regulations

.2 National Building Code of Canada (NBC):

.1 Part 8, Safety Measures at Construction and Demolition Sites.

.3 Province of British Columbia:

.1 Workers Compensation Act Part 3-Occupational Health and Safety

.2 Occupational Health and Safety Regulation

1.3 WORKERS COMPENSATION BOARD COVERAGE

.1 Comply fully with the Workers Compensation Act, regulations and orders made pursuant thereto, and any amendments up to the completion of the work.

.2 Maintain WorkSafeBC coverage during the term of the Contract, until and including the date that the Certificate of Final Completion is issued.

1.4 COMPLIANCE WITH REGULATIONS

.1 PWGSC may terminate the Contract without liability to PWGSC where the Contractor, in the opinion of PWGSC, refuses to comply with a requirement of the Workers Compensation Act Occupational Health and Safety Regulations or any other applicable regulatory guidelines.

.2 It is the Contractor's responsibility to ensure that all workers are qualified, competent and certified to perform the work as required by the Workers Compensation Act Occupational Health and Safety Regulations, or any other applicable regulatory guidelines.

1.5 SUBMITTALS

.1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Work effected by submittal shall not proceed until review is complete.

.3 Submit the following:

.1 Health and Safety Plan, within 5 working days of Award of Contract and prior to Mobilization to the Site.

.2 Copies of reports of directions issued by Federal and Provincial health and safety inspectors.

.3 Copies of incident and accident reports.

.4 Complete set of Material Safety Data Sheets (MSDS), and all other documentation required by Workplace Hazardous Materials Information System (WHMIS) requirements.

.5 Emergency Procedures.

.4 The Departmental Representative will review the Contractor's site-specific project Health and Safety Plan and emergency procedures, and provide comments to the Contractor within 5 working days after receipt of the plan. Revise the plan as appropriate and resubmit to Departmental Representative.

.5 Medical surveillance: where prescribed by legislation, regulation or safety program, submit certification of medical surveillance for site personnel prior to commencement of work, and submit additional certifications for any new site personnel to Departmental Representative.

.6 Submission of the Health and Safety Plan, and any revised version, to the Departmental Representative is for information and reference purposes only. It shall not:

.1 Be construed to imply approval by the Departmental Representative.

.2 Be interpreted as a warranty of being complete, accurate and legislatively compliant.

.3 Relieve the Contractor of his legal obligations for the provision of health and safety on the project.

1.6 RESPONSIBILITY

.1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.

.2 Comply with and enforce compliance by employees with safety requirements of Contract documents, applicable Federal, Provincial, and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

1.7 HEALTH AND SAFETY COORDINATOR

.1 The Health and Safety Coordinator must:

.1 Be responsible for completing all health and safety training, and ensuring that personnel that do not successfully complete the required training are not permitted to enter the site to perform work.

.2 Be responsible for implementing, daily enforcing, and monitoring the site-specific Health and Safety Plan.

.3 Be on site during execution of work.

1.8 GENERAL CONDITIONS

.1 Provide safety barricades and lights around work site as required to provide a safe working environment for workers and protection for pedestrian and vehicular traffic.

.2 Ensure that non-authorized persons are not allowed to circulate in designated construction areas of the work site.

.1 Provide appropriate means by use of barricades, fences, warning signs, traffic control personnel, and temporary lighting as required.

.2 Secure active portion of site with temporary to protect site against unauthorized entry.

1.9 SITE CONDITIONS

.1 Work at site will involve contact with:

.1 Metals, polycyclic aromatic hydrocarbon (PAH), hydrocarbon, and salt contaminated soil and water.

1.10 REGULATORY REQUIREMENTS

.1 Comply with specified codes, acts, bylaws, standards and regulations to ensure safe operations at site.

.2 In event of conflict between any provision of the above authorities, the most stringent provision will apply. Should a dispute arise in determining the most stringent requirement, the Departmental Representative will advise on the course of action to be followed.

1.11 WORK PERMITS

.1 Obtain speciality permit[s] related to project before start of work.

1.12 FILING OF NOTICE

.1 The Contractor is to complete and submit a Notice of Project as required by Provincial authorities.

.2 Provide copies of all notices to the Departmental Representative prior to start of work.

1.13 HEALTH AND SAFETY PLAN

.1 Conduct a site-specific hazard assessment based on review of Contract documents, required work, and project site. Identify any known and potential health risks and safety hazards.

.2 Prepare and comply with a site-specific project Health and Safety Plan based on hazard assessment, including, but not limited to, the following:

.1 Primary requirements:

.1 Contractor's safety policy.

.2 Identification of applicable compliance obligations.

.3 Definition of responsibilities for project safety/organization chart for project.

.4 General safety rules for project.

.5 Job-specific safe work, procedures.

.6 Inspection policy and procedures.

.7 Incident reporting and investigation policy and procedures.

.8 Occupational Health and Safety Committee/Representative procedures.

.9 Occupational Health and Safety meetings.

.10 Occupational Health and Safety communications and record keeping procedures.

.2 Summary of health risks and safety hazards resulting from analysis of hazard assessment, with respect to site tasks and operations which must be performed as part of the work.

.3 List hazardous materials to be brought on site as required by work.

.4 Indicate Engineering and administrative control measures to be implemented at the site for managing identified risks and hazards.

.5 Identify personal protective equipment (PPE) to be used by workers.

.6 Identify personnel and alternates responsible for site safety and health.

.7 Identify personnel training requirements and training plan, including site orientation for new workers.

.3 Develop the plan in collaboration with all subcontractors. Ensure that work/activities of subcontractors are included in the hazard assessment and are reflected in the plan.

.4 Revise and update Health and Safety Plan as required, and re-submit to the Departmental Representative.

.5 Departmental Representative's review: the review of Health and Safety Plan by Public Works and Government Services Canada (PWGSC) shall not relieve the Contractor of responsibility for errors or omissions in final Health and Safety Plan or of responsibility for meeting all requirements of construction and Contract documents.

1.14 EMERGENCY PROCEDURES

.1 List standard operating procedures and measures to be taken in emergency situations. Include an evacuation plan and emergency contacts (i.e. names/telephone numbers) of:

.1 Designated personnel from own company.

.2 Regulatory agencies applicable to work and as per legislated regulations.

.3 Local emergency resources.

.4 Departmental Representative.

.2 Include the following provisions in the emergency procedures:

.1 Notify workers and the first-aid attendant, of the nature and location of the emergency.

.2 Evacuate all workers safely.

.3 Check and confirm the safe evacuation of all workers.

.4 Notify the fire department or other emergency responders.

.5 Notify adjacent workplaces or residences which may be affected if the risk extends beyond the workplace.

.6 Notify Departmental Representative.

.3 Provide written rescue/evacuation procedures as required for, but not limited to:

.1 Work at high angles.

.2 Work in confined spaces or where there is a risk of entrapment.

.3 Work with hazardous substances.

.4 Underground work.

.5 Work on, over, under and adjacent to water.

.6 Workplaces where there are persons who require physical assistance to be moved.

.4 Design and mark emergency exit routes to provide quick and unimpeded exit.

.5 At least once during project, emergency drills must be held to ensure awareness and effectiveness of emergency exit routes and procedures, and a record of the drills must be kept.

.6 Revise and update emergency procedures as required, and re-submit to the Departmental Representative.

1.15 HAZARDOUS PRODUCTS

.1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage and disposal of hazardous materials, and regarding labelling and provision of Material Safety Data Sheets (MSDS) acceptable to the Departmental Representative and in accordance with the Canada Labour Code.

.2 Where use of hazardous and toxic products cannot be avoided:

.1 Advise Departmental Representative beforehand of the product(s) intended for use. Submit applicable MSDS and WHMIS documents as per Section 01 33 00.

1.16 ASBESTOS

.1 Removal and handling of any asbestos-containing materials encountered during remediation will be performed following all applicable Codes, Acts and Regulations.

1.17 ELECTRICAL SAFETY

.1 Comply with authorities and ensure that, when installing new facilities or modifying existing facilities, all electrical personnel are completely familiar with existing and new electrical circuits and equipment and their operation.

.1 Before undertaking any work, coordinate required energizing and de-energizing of new and existing circuits with Departmental Representative.

.2 Maintain electrical safety procedures and take necessary precautions to ensure safety of all personnel working under this Contract, as well as safety of other personnel on site.

1.18 ELECTRICAL LOCKOUT

.1 Develop, implement and enforce use of established procedures to provide electrical lockout and to ensure the health and safety of workers for every event where work must be done on any electrical circuit or facility.

.2 Prepare the lockout procedures in writing, listing step-by-step processes to be followed by workers, including how to prepare and issue the request/authorization form. Have procedures available for review upon request by the Departmental Representative.

.3 Keep the documents and lockout tags at the site and list in a log book for the full duration of the Contract. Upon request, make such data available for viewing by Departmental Representative or by any authorized safety representative.

1.19 OVERLOADING

.1 Ensure no part of work is subjected to a load which will endanger its safety or will cause permanent deformation.

1.20 FALSEWORK

.1 Design and construct falsework in accordance with CSA S269.1- 1975 (R2003).

1.21 CONFINED SPACES

.1 Carry out work in confined spaces in compliance with Provincial regulations.

1.22 FIRE SAFETY AND HOT WORK

.1 Obtain Departmental Representative's authorization before any welding, cutting or any other hot work operations can be carried out on site.

.2 Hot work includes cutting/melting with use of torch, flame heating roofing kettles, or other open flame devices and grinding with equipment which produces sparks.

1.23 FIRE SAFETY REQUIREMENTS

.1 Store oily/paint-soaked rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.

1.24 FIRE PROTECTION AND ALARM SYSTEM

.1 Fire protection and alarm systems shall not be:

.1 Obstructed.

.2 Shut off.

.3 Left inactive at the end of a working day or shift.

.2 Do not use fire hydrants, standpipes and hose systems for purposes other than firefighting.

.3 Be responsible / liable for costs incurred from the fire department, the site owner and the tenants, resulting from false alarms.

1.25 UNFORESEEN HAZARDS

.1 Should any unforeseen or peculiar safety-related factor, hazard or condition become evident during performance of the work, immediately stop work and advise the Departmental Representative verbally and in writing.

1.26 POSTED DOCUMENTS

.1 Post legible versions of the following documents on site:

.1 Health and Safety Plan.

.2 Sequence of work.

.3 Emergency procedures.

.4 Site drawing showing project layout, locations of the first-aid station, evacuation route and marshalling station, and the emergency transportation provisions.

.5 Notice of Project.

.6 Floor plans or site plans.

.7 Notice as to where a copy of the Workers Compensation Act and Regulations are available on the work site for review by employees and workers.

.8 Workplace Hazardous Materials Information System (WHMIS) documents.

.9 Material Safety Data Sheets (MSDS).

.10 List of names of Joint Health and Safety Committee members, or Health and Safety Representative, as applicable.

.2 Post all Material Safety Data Sheets (MSDS) on site, in a common area, visible to all workers and in locations accessible to tenants when work of this Contract includes construction activities adjacent to occupied areas.

.3 Postings should be protected from the weather, and visible from the street or the exterior of the principal construction site shelter provided for workers and equipment, or as approved by the Departmental Representative.

1.27 MEETINGS

.1 Attend health and safety pre-construction meeting and all subsequent meetings called by the Departmental Representative.

1.28 CORRECTION OF NON-COMPLIANCE

.1 Immediately address health and safety non-compliance issues identified by the Departmental Representative.

.2 Provide Departmental Representative with written report of action taken to correct non-compliance with health and safety issues identified.

.3 The Departmental Representative may issue a "stop work order" if non-compliance of health and safety regulations is not corrected immediately or within posted time. The General Contractor/subcontractors will be responsible for any costs arising from such a "stop work order".

END OF SECTION

1.1 DEFINITIONS

.1 Environmental Pollution and Damage: presence of chemical, physical, biological elements or agents which adversely affect human health and welfare; unfavourably alter ecological balances of importance to human life; affect other species of importance to humankind; or degrade environment aesthetically, culturally and/or historically.

.2 Environmental Protection: prevention/control of pollution and habitat or environment disruption during construction. Control of environmental pollution and damage requires consideration of land, water, and air; biological and cultural resources; and includes management of visual aesthetics; noise; solid, chemical, gaseous, and liquid waste; radiant energy and radioactive material as well as other pollutants.

1.2 SUBMITTALS

.1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.

.2 Prior to commencing construction activities or delivery of materials to site, submit an Environmental Protection Plan (EPP) for review and approval by the Departmental Representative. The EPP is to present comprehensive overview of known or potential environmental issues, which must be addressed during construction.

.3 Submit EPP to the Departmental Representative within 5 working days of award. The Departmental Representative will review the Contractor's EPP and provide comments to the Contractor within three (3) days after receipt of the plan. Revise the plan as appropriate and resubmit to Departmental Representative.

.4 The Contractor will have an EPP in place prior to initiating work. The EPP must include, but is not limited to, the following:

- .1 Names of persons responsible for ensuring adherence to EPP.
- .2 Names and qualifications of persons responsible for training site personnel.
- .3 Descriptions of EPP training program.
- .4 Erosion and sediment control plan which identifies type and location of erosion and sediment controls to be provided including monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations.
- .5 The Contractor must have provision in the EPP for mitigating impacts of runoff to streams or marine waters.
- .6 Drawings showing locations of proposed temporary excavations or embankments for haul roads, material storage areas, structures, sanitary facilities, and stockpiles of excess or spoil materials including methods to control runoff and to contain materials on site.
- .7 Traffic control plans including measures to reduce erosion of temporary roadbeds by construction traffic, especially during wet weather. Plans include measures to minimize amount of mud transported onto paved public roads by vehicles or runoff.
- .8 Work area plan showing proposed activity in each portion of area and identifying areas of limited use or non-use. Plan to include measures for marking limits of use areas including methods for protection of features to be preserved within authorized work areas.

.9 Spill Control Plan: including procedures, instructions, and reports to be used in event of unforeseen spill of regulated substance.

.10 Non-Hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris.

.11 Air pollution control plan detailing provisions to assure that dust, debris, materials, and trash, do not become air borne and travel off project site.

.12 Contaminant prevention plan that: identifies potentially hazardous substances to be used on job site; identifies intended actions to prevent introduction of such materials into air, water, or ground; and details provisions for compliance with Federal, Provincial, and Municipal laws and regulations for storage and handling of these materials.

.13 Waste water management plan that identifies methods and procedures for management and/or discharge of waste waters which are directly derived from construction activities, such as concrete curing water, clean-up water, dewatering of ground water, and water used in flushing of lines.

.14 The Contractor will identify the equipment that will be used for treatment of excavation water during dewatering.

.15 Procedures for identifying and protecting historical, archaeological, cultural resources and biological resources.

1.3 FIRES

.1 Fires and burning of rubbish on site is not permitted.

1.4 DISPOSAL OF WASTES

.1 Segregation, removal, and off-site disposal of vegetation at the portion of the site to be excavated (grasses, small shrubs, and blackberry), as well as several piles of mixed soil and brush from previous works that are located on the Parcel 44 site.

.2 Removal and off-site disposal of logs at the site surface and large woody debris segregated during excavation.

.3 Removal and off-site disposal of the wooden shed and debris contained within, one creosote power pole, and a metal tank (partially filled with water) at the site surface.

.4 Do not bury rubbish and waste materials on site.

.5 Do not dispose of waste or volatile materials, such as mineral spirits, oil or paint thinner into waterways, storm or sanitary sewers.

.6 All materials removed from the site will be reused, recycled or disposed of through an approved landfill.

1.5 DRAINAGE

.1 The southern and western limits of the remedial excavation will extend to the inferred edge of the intertidal zone where tidal marine water would enter the excavation (Drawing 3).

.2 Provide erosion and sediment control plan that identifies type and location of erosion and sediment controls to be provided. Plan to include monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations.

.3 All water collected from the excavation must be collected, treated for hydrocarbons, total suspended solids, metals and pH, and transferred to storage tanks for settling and testing by the Departmental Representative prior to discharge.

.4 The Departmental Representative will conduct water quality testing prior to discharge to ensure compliance with applicable regulations. The Contractor should provide contingency for 1 week minimum water storage capacity to allow for testing, laboratory analysis and communication of results.

.5 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

1.6 SITE CLEARING AND PLANT PROTECTION

.1 Protect trees and plants on adjacent properties to the site.

1.7 GROUNDWATER MONITORING WELL PROTECTION

.1 Existing groundwater monitoring wells outside the remediation area must be protected from damage and remain capped during all remediation activities. Monitoring well locations are shown on Drawing 3.

.2 All groundwater monitoring wells in the remedial area can be dug out during remediation.

1.8 POLLUTION CONTROL

.1 Maintain temporary erosion and pollution control features installed under this contract.

.2 Control emissions from equipment to local authorities' emission requirements.

.3 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.

1.9 NOTIFICATION

.1 The Departmental Representative will monitor the remediation to monitor conformance with the drawings and specifications. Such monitoring will not relieve the Contractor of their obligations and duties under the contract.

.2 Departmental Representative will notify Contractor in writing of observed non-compliance with Federal, Provincial or Municipal environmental laws or regulations, permits, and other elements of Contractor's Environmental Protection plan.

.3 Contractor: after receipt of such notice, inform the Departmental Representative of proposed corrective action and take such action for approval by the Departmental Representative.

.4 The Departmental Representative will issue stop order of work until satisfactory corrective action has been taken.

.4 No time extensions granted or equitable adjustments allowed to Contractor for such suspensions.

1.10 SPILLS OR RELEASE OF DELETERIOUS SUBSTANCES

.1 Measures to be implemented to prevent, control or mitigate spills or release of deleterious substances:

.1 Contractors shall take due care to ensure no deleterious materials enter any surface drainage pathways located in the project area. The recommendations in the Land Development Guidelines for the Protection of Aquatic Habitat (Chillibeck et al. 1993) and the Fisheries and Oceans Canada requirements for erosion and sediment control shall be implemented, if applicable. Silt-laden runoff water from the site shall not be allowed to enter nearby surface water. Engineering controls, such as silt fences and silt curtains shall be implemented, as required, to ensure proper isolation of soil from groundwater and surface water.

.2 All equipment maintenance, fuel storage and equipment re-fuelling must be conducted in a designated area away from any surface water drains or collection points and at least 30 m away from the marine water.

.3 Emergency response procedure for spills of deleterious substances must be in place. In the event of a Level I spill (easily contained and cleaned) the contractor will be required to provide Level I spill response. The Contractor will call the Departmental Representative and 911 in the event that there is a Level II spill (spill that cannot be easily contained or cleaned up).

.4 Response equipment to be on site at all times (i.e. spill kits) and workers trained in their location and use. The resources on hand must be sufficient to respond effectively and expediently to any spill that could occur on site.

.5 All construction equipment brought onto the site will be clean and properly maintained.

.6 Any equipment remaining on site overnight shall have appropriately placed drip pans

.7 Waste generated will be prevented from entering the environment.

.8 Prevent discharges containing asphalt, grout, concrete or other waste materials from reaching storm drains or the marine environment. This includes, but is not limited to:

i. Cleaning equipment off site; and

ii. Protection of any other drainage structures not identified here with filter fences and/or silt socks, if required.

.9 Protection of the roadways from tracking of mud, soil and debris needs to be maintained throughout the work. This includes utilizing a street sweeper as needed on Thomas Road and Modeste Road to keep the roads free of tracked mud, soil and debris. This requirement may necessitate improving the on-site haul road and haul road to and within the temporary stockpile area with a layer of gravel or crushed rock.

.10 Limit of work activities to normal business hours to minimize noise outside of those hours. Ensure that equipment and machinery is properly maintained to minimize unnecessary noise pollution. Consider local municipal noise bylaws when mobilizing equipment.

.11 All utilities must be located prior to excavation through a BC One call and a private utility location company to ensure all underground utilities are properly located.

1.11 IMPORT OF FILL MATERIAL

1.12 DEFINITIONS

.1 Soil includes:

(a) unconsolidated mineral or organic material;

(b) fill; and

(c) sediment deposited on land.

1.13 FILL CHARACTERIZATION AND DOCUMENTATION

.1 Prior to import of any material used for surfacing, backfilling or any other use requiring fill material the Contractor will submit sufficient documentation, including stamped letter by an appropriate professional designation dated no older than six months, and as agreed on by Departmental Representative, to ensure that the imported material meets the Canadian Council of Ministers of the Environment (CCME) Residential (RL) land usage soil quality guidelines for CCME metals, CCME polycyclic aromatic hydrocarbons and CCME PHC Fractions F1, F2, F3 and F4 and/or the BC CSR Protocol 4 regional background soil quality estimates for Vancouver Island.

.2 Environmental characterization of fill material must be conducted in accordance with the following:

.1 British Columbia, Ministry of Environment, Technical Guidance Document #1 – Site Characterization and Confirmation Testing.

.3 Prior to import of any material the Contractor must inform the Departmental Representative of the proposed fill source(s) and identify the nature of current and historic activities conducted at the source.

.4 Backfill must not be placed without the approval of the Departmental Representative.

.5 Departmental Representative reserves the right to request additional testing of imported material at the source and at the deposit site to satisfy their requirements. All testing will be done at the Contractor's cost.

.6 Departmental Representative may conduct additional testing of imported material at the source and at the deposit site to satisfy their requirements and confirm the results.

.7 All material brought to the site that does not meet the CCME RL guidelines will be removed from the property immediately at the Contractors cost.

.8 It is the Contractor's responsibility to have the backfill material inspected by a geotechnical engineer and compacted to not less than 95% maximum dry density, or equivalent as defined in writing by the Departmental Representative. Backfill engineering deliverables include a letter stamped by a Professional Engineer registered in British Columbia that indicates the compaction testing results meet the 95% maximum dry density RFP requirement.

1.14 SUSTAINABLE REMEDIATION

.1 Energy:

.1 Maintain equipment at peak performance to maximize efficiency.

.2 Evaluate and optimize energy efficiency of equipment with high energy demands periodically and adjust operations accordingly.

.3 Replace, repower, or retrofit older engines with advanced emission control devices to reduce harmful pollutants.

.4 Control nuisance odours associated with diesel emissions from construction equipment.

.5 Maintain engines to meet original standards and train operators to run equipment efficiently.

.2 Air Emissions:

.1 Reduce atmospheric release of toxic or priority pollutants and minimize dust export of contaminants.

.2 Consolidate onsite and offsite vehicular trips to reduce fuel consumption.

.3 Revegetate excavated areas as quickly as possible.

.4 Maintain engines of vehicles and machinery in accordance with manufacturer recommendations.

.5 Modify field operations through combined activity schedules, an idle reduction plan, and using machinery with automatic idle-shutdown devices.

END OF SECTION

1.1 REFERENCES (Latest Version)

.1 Canadian Construction Documents Committee (CCDC)

.2 Canadian General Standards Board (CGSB)

.3 Canadian Standards Association (CSA International)

.4 Measurement Canada: Weights and Measures Act

1.2 SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

1.3 INSTALLATION AND REMOVAL

.1 Prepare site plan indicating proposed location and dimensions of active work area to be delineated by temporary fencing used by Contractor, number of trailers to be used, avenues of ingress/egress to fenced area and details of fence installation.

.2 Prepare site plan indicating the proposed route of the temporary fencing to be set-up at the upland boundary of the Parcel 44 site between the completion of remediation and February 29, 2016.

.3 Identify areas that have to be gravelled to prevent tracking of mud.

.4 Indicate use of the proposed stockpile staging area(s) (shown on attached Drawing 2).

.5 Provide construction facilities in order to execute work expeditiously.

.6 Remove from site all such work after use.

.7 Deconstruct the concrete lock block vault and place the lock blocks at the site perimeter to restrict access as directed by the Departmental Representative.

1.4 CONSTRUCTION PARKING

.1 Parking will be permitted on site provided it does not disrupt performance of Work. Acceptable parking areas will be determined and agreed upon by Departmental Representative prior to initiation of work.

.2 Provide and maintain adequate access to project site.

1.5 OFFICES

.1 Provide office, lighted and ventilated, of sufficient size to accommodate site meetings, and furnished with drawing laydown table and workstation for up to two Departmental Representatives. Office must be located on the Parcel 44 site.

.2 Provide marked and fully stocked first aid case in a readily available location.

.3 Subcontractors to provide their own offices as necessary. Direct location of these offices to Departmental Representative for approval.

.4 Maintain in clean condition.

1.6 EQUIPMENT, TOOL AND MATERIALS STORAGE

.1 Provide and maintain, in clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.

.2 Locate materials not required to be stored in weatherproof sheds on site in manner to cause least interference with work activities.

1.7 SANITARY FACILITIES

.1 Provide sanitary facilities for work force in accordance with governing regulations and ordinances.

.2 Post notices and take precautions as required by local health authorities. Keep area and premises in sanitary condition.

1.8 CLEAN-UP

.1 Remove construction debris, waste materials, and packaging material from work site daily.

.2 Clean dirt or mud tracked onto paved or surfaced roadways.

END OF SECTION

1.1 INSTALLATION AND REMOVAL

.1 Temporary fencing will be required around the entire working area of the site to separate pedestrian and vehicle traffic from the excavation during project work.

.2 After remediation is complete, temporary fencing will be required at the upland boundary of the Parcel 44 site between the completion of remediation and February 29, 2016.

.3 Deconstruct the concrete lock block vault and place the lock blocks at the site perimeter to restrict access as directed by the Departmental Representative.

.4 Provide temporary controls in order to execute Work expeditiously.

.5 Remove from site all such work after use.

1.2 GUARD RAILS AND BARRICADES

.1 Provide secure, rigid guard rails and barricades around work areas as required by WorkSafeBC regulations.

1.3 ACCESS TO SITE

.1 Provide and maintain access roads, sidewalk crossings, ramps and construction runways as may be required for access to Work.

1.4 FIRE ROUTES

.1 Maintain access to property including overhead clearances for use by emergency response vehicles.

1.5 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY

.1 Protect surrounding private and public property from damage during performance of Work.

.2 Be responsible for damage incurred.

END OF SECTION

1.1 PROJECT CLEANLINESS

.1 Maintain project area and roads in tidy condition, free from accumulation of waste products and debris. This includes roads to and from the site and to and from the temporary stockpile area.

.2 Remove waste materials from site at daily regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site.

.3 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.

.4 Provide on-site containers for collection of waste materials and debris.

.5 Dispose of waste materials and debris off site.

.6 Clean interior areas prior to start of finishing work, and maintain areas free of dust and other contaminants during finishing operations.

.7 Store volatile waste in covered metal containers, and remove from premises at end of each working day.

.8 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

1.2 FINAL CLEANING

.1 When Work is substantially performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.

.2 Remove waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy.

.3 Prior to final review remove surplus products, tools, construction machinery and equipment.

.4 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.

.5 Sweep and wash clean paved areas, including Thomas Road.

.6 Clean equipment and fixtures to sanitary condition; clean or replace filters of mechanical equipment.

.7 Clean drainage systems.

END OF SECTION

1.1 INSPECTION AND DECLARATION

.1 Contractor's Inspection: Contractor and Subcontractors: conduct inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.

.1 Notify Departmental Representative in writing of satisfactory completion of Contractor's Inspection and that corrections have been made.

.2 Owner Inspection: Departmental Representative and Contractor will perform inspection of Work to identify obvious defects or deficiencies. Any deficiencies will be corrected by the Contractor at their cost.

.3 Completion: submit written certificate that following have been performed:

.1 Work has been completed and inspected for compliance with Contract Documents.

.2 Defects have been corrected and deficiencies have been completed.

.3 Work is complete and ready for final inspection.

.4 Declaration of Substantial Performance: when Departmental Representative considers deficiencies and defects have been corrected and it appears requirements of Contract have been substantially performed, make application for certificate of Substantial Performance.

.5 The Contractor will remove any erosion control measures and temporary fencing upon completion of the work and at the direction of the Departmental Representative.

.6 Environmental control measures such as silt curtains and absorbent booms must remain in place until the Departmental Representative determines they are no longer required.

.7 The Contractor shall removal all silt fencing and hydrocarbon absorbent padding and booms when the Departmental Representative determines they are no longer required.

1.2 CLEANING

.1 In accordance with Section 01 74 11 - Cleaning.

END OF SECTION

1.1 SUBMITTALS

.1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.

.2 Furnish evidence, if requested, for type, source and quality of products provided.

.3 Defective products will be rejected, regardless of previous inspections. Replace products at own expense.

1.2 AS-BUILTS AND SAMPLES

.1 Maintain at site one record copy of:

- .1 Contract Drawings.
- .2 Specifications.
- .3 Addenda.
- .4 Change Orders and other modifications to Contract.
- .5 Reviewed shop drawings, product data, and samples.
- .6 Field test records.
- .7 Inspection certificates.
- .8 Manufacturer's certificates.

.2 Store record documents and samples in field office apart from documents used for construction. Provide files, racks, and secure storage.

.3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual. Label each document "PROJECT RECORD" in neat, large, printed letters.

.4 Maintain record documents in clean, dry and legible condition. Do not use record documents for construction purposes.

.5 Keep record documents and samples available for inspection by the Departmental Representative.

1.3 FINAL SURVEY

.1 The Contractor will be required to provide an as-built survey, completed by the Contractor’s Surveyor, stamped and sealed by a qualified land surveyor registered in BC, following remediation that at minimum identifies the following:

- .1 Excavation footprint and topography.
- .2 New utility location(s).
- .3 Decommissioned and/or abandoned utilities encountered.
- .4 Utilities encountered not on current Drawings.
- .5 Route of temporary fencing at the upland boundary of the Parcel 44 site.

END OF SECTION

1.1 Related Sections

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 78 00 - Closeout Submittals.

.3 Section 31 23 33.01 - Excavation, Trenching and Backfilling.

1.2 Summary

.1 Work includes:

.1 Implementation of safety work zones, site Health and Safety Plans and Emergency Response Plans.

.2 Installation and maintenance of temporary fencing around the active work site for duration of project, and at the upland boundary of the Parcel 44 site between the completion of remediation and February 29, 2016.

.3 Segregation, removal, and off-site disposal of vegetation at the portion of the site to be excavated (grasses, small shrubs, and blackberry), as well as several piles of mixed soil and brush from previous works that are located on the Parcel 44 site, but not within the proposed excavation area.

.4 Removal and off-site disposal of logs at the site surface and large woody debris segregated during excavation.

.5 Removal and off-site disposal of the wooden shed and debris contained within, one creosote power pole, and a metal tank (partially filled with water) at the site surface.

.6 Deconstruction of the concrete lock block vault and placement of the lock blocks at the site perimeter to restrict access as directed by the Departmental Representative.

.7 Repair and re-instate to their original condition any utilities encountered during the works. Contractor shall survey the location of maintained, re-routed and abandoned underground lines and include on final as-built drawing.

.8 Removal, temporary stockpiling, and re-use of clean sand backfill material from previous remediation on-site and on the adjacent Esquimalt Nation IR in order to access contaminated fill.

.9 Preparation of temporary stockpile location(s), including surfacing of access and haul roads if required.

.10 Excavation, loading, and stockpiling at the stockpile area of the contaminated fill material for characterization by the Departmental Representative.

.11 Excavation, segregation, transport to and from the stockpile area, riprap and boulder fill encountered for placement at the site perimeter to restrict access as directed by the Departmental Representative.

.12 Dewatering of excavation as necessary and storage, treatment, and discharge of treated water as determined by the Departmental Representative based on laboratory analytical results.

.13 Stockpiling of soils in approximately 50 m^3 piles, or pile sizes as directed by the Departmental Representative, in the designated area while awaiting characterization, and loading soil from stockpiles into trucks for off-site disposal.

.14 Allowing and assisting the Departmental Representative to collect soil samples from the excavations for characterization purposes to confirm that sufficient remediation has taken place.

.15 Loading, transport, and off-site disposal of the contaminated soils at Provincially Permitted facility and authorized off-site treatment or disposal facilities, based on the soil classification as defined by the Departmental Representative based on representative laboratory analysis.

.16 Provision, placement, grading, and compaction of backfill to restore the excavated area to pre-excavation conditions as outlined in Section 31 23 33.01 - Excavation, Trenching and Backfilling.

.17 Placement of a 12-mil HDPE liner along any excavation wall, the full depth of the excavation, where contamination remains but where the maximum extent of excavation has been reached.

.18 Maintaining erosion and sediment control at the site, including covering stockpiles, and appropriately managing any excavation water.

.19 Traffic control where required to maintain a safe work or traffic area for Esquimalt IR users.

.2 Unit Prices.

.1 Provide unit costs for soil remediation in the Unit Price Table form provided.

1.3 References (Latest Edition)

.1 British Columbia Contaminated Sites Regulation and Hazardous Waste Regulation.

.2 CCME (Canadian Council of Ministers of the Environment) Contaminated Sites, Contaminated Soil and Groundwater, and Remediation of Contaminated Sites most current publications.

1.4 Submittals Within 5 Working Days of Award

.1 Identify subcontractors and provide evidence of appropriate licensing if they are involved with transport of contaminated soils or Hazardous Waste.

.2 Identify the facility(s) that will be used to treat and/or dispose of each of the categories of materials identified. Provide evidence that they are provincially Permitted and authorized and/or licensed to accept, treat and dispose of the specific category of material. Work will NOT proceed until the Departmental Representative is satisfied the receiving facilities are appropriately qualified and afford PWGSC suitable liability protection.

1.5 Contaminated Soil

.1 The following table summarizes the estimated soil volumes for off-site disposal and re-use on-site at the western upland portion of the Parcel 44 site. Drawing 3 shows the areas used to calculate the volumes:

Summary of Estimated Soil Volumes

Contamination Type	Estimated Volume (m^3)*	Estimated Contaminated Soil Tonnage For Off-Site Disposal (tonnes) **	Estimated Soil Tonnage For Re-Use On-Site (tonnes) **
Fill contaminated with metals (inc. Na/Cl) > CSR CL and PAHs / Hydrocarbons > CSR RL (Off-Site Disposal)	1,000	2,000	0
Fill contaminated with metals (inc. Na/Cl) and PAHs / Hydrocarbons > CSR RL and < CSR CL (Off-Site Disposal)	400	800	0
Fill contaminated with metals (inc. Na/Cl), PAHs, and Hydrocarbons < CSR RL and > CSR Schedule 7 (soil relocation to non-agricultural land) (Off-Site Disposal)	400	800	0
Fill characterized as meeting CCME RL guidelines and geotechnically suitable for re-use on-site	250	0	500
Excavate, segregate, transport to and from stockpile area, riprap and boulder fill for placement at the site perimeter	50	0	100
Total	2,100	3,600	600

* - actual volumes / tonnages will depend on ex-situ characterization

** - a conversion factor of 2.0 tonnes/m^3 was used

.2 Stockpiles will be classified at end of day after 6 working days (after receipt at the laboratory) for non-hazardous waste material. If additional testing is required to determine whether the material would be classified as Hazardous Waste then an additional 4 working days will be required. Once classified the soil can be loaded into trucks for transport to the disposal facility, or, if they are classified as less than CCME RL guidelines, they will be used for backfilling (providing they are geotechnically suitable). If not suitable for geotechnical use on site, the disposal location will be designated based on the analytical results.

.3 In the stockpile staging area the Contractor must:

1. Install 6-mil polyethylene liner below the proposed stockpile area to prevent contact with underlying soil.
2. Provide 6-mil polyethylene liner capable of covering stockpiled material until Departmental Representative advises the contractor on handling procedure. The tarps must remain in place at all times and it will be the Contractors responsibility to ensure they are not left off or blown off the stockpiles.

.4 Store non-contaminated excavated soil only on non-contaminated site surface areas. Ensure no contact between non-contaminated excavated soil and drainage or contaminated water or contaminated soil.

1.6 Contingency for Handling Hazardous Waste Soil

.1 Sampling and testing of materials at the site have thus far not identified Hazardous Waste soil or material as being present. However, Hazardous Waste soils may exist on site.

.2 The Contractor shall be prepared to handle suspect Hazardous Waste soil, if encountered.

.3 The Contractor should have on-hand the requisite transport and disposal equipment and materials (including manifests etc.). This may include the need to segregate portions of the excavated material from other bulk materials during transport.

.4 The Contractor shall excavate, segregate, haul separately and dispose of Hazardous Waste material to an authorized facility pre-approved by the Departmental Representative.

.5 Suspect Hazardous Waste material shall not be mixed or consolidated with any other material.

1.6 New Materials and Equipment

.1 Ship, store and preserve in original packaging with manufacturer's seal and label remaining intact.

.2 Ensure materials and equipment are not damaged, altered or soiled during shipment, handling and storage.

.3 Transport rejected equipment and materials from work site immediately.

.4 Store materials and equipment according to manufacturer's and supplier's instructions.

.5 Establish a quality management system for materials and equipment.

1.7 Project/Site Conditions

.1 Existing Conditions.

.1 Review the excavation area on Drawing 3 that summarizes the approximate extent of soil excavation.

1.8 Sequencing

.1 Obtain a non-contaminated source of fill that meets CCME Residential Land Use (RL) guidelines prior to starting excavation. Adequate characterization of all materials must be completed and reported to the Departmental Representative prior to transport and placement at the site. Any non-compliant material will be excavated, loaded and transported off-site at the Contractor’s cost.

.2 All other work should be sequenced in consultation with the Departmental Representative.

.3 All excavation and backfilling works will need to be completed by February 29, 2016.

1.9 Equipment

.1 Trucks.

.1 Cleaned between loads of contaminated soil and clean fill.

.2 Cleaned at end of Work.

.3 Use watertight truck bodies for transporting contaminated soil.

1.10 Protection

.1 General Site Protection.

.1 Keep excavation sites water free throughout work and manage recovered water according to contamination levels.

.2 Protect excavation from rainwater.

.3 Provide temporary structures to divert flow of surface waters for excavation.

.2 Archaeological Monitoring.

.1 Results of previous site investigations identified the potential presence of areas of archaeological significance. An archaeological monitor will be present (as required) during the excavation activities to assist in identifying the extent of these areas. The Departmental Representative will coordinate the archaeological monitoring.

1.11 Soil Transport

.1 All soil within the identified contaminated zones that exceeds CCME CL concentrations must be removed from the site and be transported to a facility Provincially Permitted to receive the material quality being disposed of or treated. Drawing 3 summarizes the soil quality at the site. Soil data is included in the attached Tables.

1.12 Restoration

.1 Restore excavated portions to pre-excavation conditions with:

1. Imported non-contaminated (i.e. must meet CCME RL soil quality guidelines) “Crushed Granular Sub-base” material as defined by the MMCD Section 02226.
2. Excavated and stockpiled soil classified as “not-contaminated” (less than CCME RL), and determined by the Contractor’s geotechnical engineer that the material is suitable for re-use as backfill.
3. Sand backfill material placed during previous remediation on-site and at adjacent site and excavated and stockpiled to access contaminated soil. After remediation is complete, replacement fill will be required to restore the site to pre-excavation conditions.

.2 The final grade of the site will slope gently southwards towards Plumper Bay.

.3 Clean permanent access roads of contamination resulting from project activity at request of Departmental Representative.

.4 Place segregated riprap and boulder fill at the site perimeter to restrict access as directed by the Departmental Representative.

.5 Install temporary fencing at the upland boundary of the Parcel 44 site between the completion of remediation and February 29, 2016.

END OF SECTION

1.1 Related Sections

.1 Section 02 61 00.01 - Soil Remediation

.2 Section 01 35 29.06 - Health and Safety Requirements

.3 Section 01 56 00 - Temporary Barriers and Enclosures

.4 Section 01 35 43 - Environmental Procedures

1.2 Measurement Procedures

.1 Excavated materials will be measured in accordance with the following procedure.

.1 For soil that will be excavated, segregated, and stockpiled while awaiting analytical results and characterization, for each distinct type of soil excavated and then stockpiled the Contractor will:

.1 Fill a truck and/or truck and pup to an agreed upon fill level that represents a specific volume of material.

.2 The truck and/or truck and pup will then transport and deposit the fill in the stockpile area. The same volume will be placed in the truck and/or truck and pup and the procedure will be repeated until approximately 50 m^3 have been placed in a stockpile. The Departmental Representative will monitor the loading of all trucks and reserves the right to request addition of material if trucks have not been filled to the specified load height. The Departmental Representative and the Contractor's representative will agree on stockpile volumes at the end of each day's work.

.3 At the discretion of the Departmental Representative, a minimum of one truck per day will require weighing with the agreed upon fill level to reconcile the estimated volume with the actual weight of the truck.

.4 The volume of all stockpiles will be used to estimate the total volume excavated and will form the measurement for the measure of payment.

.5 Stockpiles classified as non-contaminated (< CCME Residential Land Use guidelines) and determined to be geotechnically suitable for backfilling will be used for backfilling purposes. The agreed upon volumes will be used as the form of measurement for the measure of payment for transport from the stockpile area to the excavation, placement, and compaction.

.2 For soil loaded from a stockpile of classified soil, the truck will be weighed at a certified weigh scale station and the weigh scale records will form the weight of measure for the measure of payment.

.3 For backfill materials imported to the site that are subsequently placed and compacted to restore site conditions, each distinct type of material imported will be weighed at a certified scale prior to delivery to the site and the weigh scale records will form the weight of measure for the measure of payment. Backfilling to authorized excavation limits will be measured in tonnes for each type of material specified.

.4 In accordance with Section 01 35 43 - Environmental Procedures all imported backfill material must be shown to meet CCME RL guidelines prior to transport and placement as backfill. The Departmental Representative must review and

approve all backfill. Any imported fill not meeting the applicable site guidelines will be removed at the Contractor's cost.

1.3 References

.1 American Society for Testing and Materials International (ASTM)

.1 ASTM D422-632002, Standard Test Method for Particle-Size Analysis of Soils.

.2 ASTM D4318-05, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

1.4 Submittals

.1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit excavation design at a minimum of 5 working days prior to beginning Work.

.3 Submit proof of good standing with WorkSafeBC.

.4 Submit WorkSafeBC Notice of Project prior to mobilizing to the site.

.6 Keep design and supporting data on site.

.7 Do not use any imported fill material until written report of soil test results are reviewed and approved by the Departmental Representative.

1.5 Existing Conditions

1. Existing services:

.1 Before commencing work, confirming locations of all utility lines within and immediately surrounding the work area. Drawing 3 shows the work area and proposed excavation limits.

.5 Arrange with appropriate authority for relocation of buried services that interfere with execution of work: pay costs of relocating services.

.6 Remove obsolete buried services within 2 m of foundations: cap cut-offs.

.7 Prior to beginning excavation Work, notify applicable Departmental Representative and authorities having jurisdiction and establish location and state of use of buried utilities and structures. Clearly mark such locations to prevent disturbance during Work.

.8 Maintain and protect from damage any utilities and structures encountered.

.9 Where utility lines or structures exist in area of excavation, obtain direction of Departmental Representative before removing and re-routing.

.10 Contractor shall survey the location of maintained, re-routed and abandoned underground lines and include on **final as-built drawing**.

1.6 Site Preparation

.1 Removal and off-site disposal of obstructions from surfaces on-site, both within and outside the proposed excavation area:

.1 Segregation, removal, and off-site disposal of vegetation at the site. This includes grasses, small shrubs, and blackberry etc. that are presently growing, as well as several piles of mixed soil and brush from previous works at the site.

.2 Wooden logs at the site surface.

.3 Wooden shed and debris contained within, including non PCB-containing light ballasts and dead electrical panel.

.4 One creosote power pole located immediately east of the shed.

.5 Metal tank (approximately 1,000 L) partially filled with water.

.2 Deconstruct the concrete lock block vault and place the lock blocks at the site perimeter to restrict access as directed by the Departmental Representative.

.3 Conduct a survey and mark the site boundaries and proposed excavation extents as shown on Drawing 3 prior to start of remediation.

.1 The Departmental Representative will provide an AutoCAD file of the current site topography and boundaries.

.2 Contractor will conduct surveying on an on-going basis of excavation limits and excavation topography, in order to create the final as-built survey submittal.

.3 Surveyed site boundaries will be used for placement of temporary fencing and concrete lock blocks from the concrete lock block vault.

1.7 Preparation/Protection

.1 Protect existing features in accordance with Section 01 56 00 - Temporary Barriers and Enclosures and applicable local regulations.

.2 Protect all existing groundwater monitoring wells outside excavation area on-site and on the Esquimalt IR from damage while Work is in progress. In event of damage, immediately make repair as directed by Departmental Representative. Existing groundwater monitoring wells on-site and in the vicinity of the site are shown on Drawing 3.

.3 Keep excavations clean, free of standing water, and loose soil.

.4 Where soil is subject to significant volume change due to change in moisture content, cover and protect to Departmental Representative approval.

.5 Protect buried services that are required to remain undisturbed.

1.8 Dewatering

.1 Protect open excavations against flooding and damage due to surface run-off.

.2 All water collected from the excavation must be collected, treated for hydrocarbons, total suspended solids, metals and pH, and transferred to storage tanks for settling and testing by the Departmental Representative prior to discharge. The discharge location will be determined by the Departmental Representative depending on treated water quality. The Contractor should allow for 6 working days (from receipt at the laboratory) of treated water storage to allow the Departmental Representative to receive analytical results and provide direction.

.3 Dispose of water in a manner not detrimental to public and private property and in accordance to all applicable regulatory requirements.

.4 Provide any required storage tanks, flocculation tanks, settling basins, or other treatment facilities to remove suspended solids, contaminants, or other materials before discharging to the site.

.5 It should be noted the area is adjacent to the marine environment and excavation and/or backfilling will have to be timed with the low tide cycle to minimize water treatment.

1.9 Excavation Volumes

.1 The following table summarizes the estimated soil volumes for off-site disposal and re-use on-site at the western upland portion of the Parcel 44 site. Drawing 3 shows the areas used to calculate the volumes:

Summary of Estimated Soil Volumes

Contamination Type	Estimated Volume (m^3)*	Estimated Contaminated Soil Tonnage For Off-Site Disposal (tonnes) **	Estimated Soil Tonnage For Re-Use On-Site (tonnes) **
Fill contaminated with metals (inc. Na/Cl) > CSR CL and PAHs / Hydrocarbons > CSR RL (Off-Site Disposal)	1,000	2,000	0
Fill contaminated with metals (inc. Na/Cl) and PAHs / Hydrocarbons > CSR RL and < CSR CL (Off-Site Disposal)	400	800	0
Fill contaminated with metals (inc. Na/Cl), PAHs, and Hydrocarbons < CSR RL and > CSR Schedule 7 (soil relocation to non-agricultural land) (Off-Site Disposal)	400	800	0
Fill characterized as meeting CCME RL guidelines and geotechnically suitable for re-use on-site	250	0	500
Excavate, segregate, transport to and from stockpile area, riprap and boulder fill for placement at the site perimeter	50	0	100
Total	2,100	3,600	600

* - actual volumes / tonnages will depend on ex-situ characterization

** - a conversion factor of 2.0 tonnes/m^3 was used

1.10 Excavation Procedure

.1 Clean imported sand fill placed as backfill on-site and on the adjacent Esquimalt IR after previous remediation work will have to be removed and stockpiled separately in the soil stockpile area in order to access the contaminated soils. This fill meets CCME RL guidelines and will be used as backfill for the remedial excavation. Approximate location of this clean sand backfill and the extent to be excavated is shown on Drawing 3.

.2 Keep excavated and stockpiled materials a safe distance from the excavation and in the area provided by the Departmental Representative.

.3 Maintain sides and slopes of excavations in a safe condition by appropriate methods and in accordance with all applicable WorkSafeBC regulations.

.4 Contractor must obtain all excavation permits from authority having jurisdiction.

.5 Restrict vehicle operations directly adjacent to open trenches.

.6 Dispose of excavated material in an approved location off-site based on ex-situ soil characterization.

.7 Do not obstruct flow of surface drainage or natural watercourses.

.8 Obtain Departmental Representative approval of completed excavation.

.9 Following removal of designated material, the Departmental Representative will collect confirmatory samples to ensure that all impacted soil has been removed. The Contractor must make clean the bottom and walls of the excavation (including water and other waste material) and provide clear access for the Departmental Representative.

.10 Departmental Representative will send samples for chemical analysis by a certified laboratory. The Contractor should anticipate sample analysis turnaround time (TAT) of 5 working days (excluding weekends and holidays) from sample receipt at the laboratory (approximately 8 working days total). Additional analysis for leachability compared to the BC Hazardous Waste Regulation may be required based on initial analytical results, which would require an additional 4 day turnaround time. The Contractor must anticipate this schedule and factor it into the unit price costing.

.11 The Contractor may wish to backfill or re-grade before analytical results are received or before direction from the Departmental Representative if geotechnically suitable (e.g. to keep the site safe, or to preclude the need for water management etc.). If backfill needs to be removed to access further contaminated soil, the Contractor will bear all cost associated with:

.1 Any excavation of the backfill, disposal of material (if impacted by placement in the excavation), purchase, transport, placement and compaction of backfill material.

2.0 Identification of Remaining Soils

1. This phase of remediation will not remove all contaminated soil as it will be restricted to the western upland portion of the Parcel 44 site. The contractor must ensure that remaining impacted in-situ material is kept separate from excavated areas. At a minimum the contractor must place a 12-mil polyethylene liner between clean soil/excavated areas and contaminated soil/unexcavated areas, across the full depth of the interface, as a marker to indicate the boundary between clean and potentially contaminated soils. Areas that will likely require marking include but may not be limited to:

.1 The western, southern and southeastern edges of the excavation area as shown on Drawing 3.

2.1 Backfilling

.1 Placement of a 12-mil HDPE liner along any excavation wall, the full depth of the excavation, where contamination remains but where the maximum extent of excavation has been reached

.2 Three types of backfill will be used:

1. Sand backfill material placed during previous remediation on-site and at adjacent site and excavated and stockpiled to access contaminated soil.
2. Stockpiled materials excavated and classified as non-contaminated (below CCME RL quality) will be used for backfilling if deemed to be geotechnically suitable by a geotechnical consultant retained by the Contractor.

3. Imported non-contaminated (i.e. must meet CCME RL soil quality guidelines) "Crushed Granular Sub-base" material as defined by the MMCD Section 02226.

.3 Excess material will be disposed of as designated by Departmental Representative. Stockpile backfill materials in areas designated by Departmental Representative. Protect backfill materials from contamination.

.4 Placement and compaction of backfill.

.1 Place backfill material in no greater than 150 mm lifts or as directed by the geotechnical consultant retained by the Contractor: add control moisture content as required to achieve specified density.

.3 Compact each layer of material to 95% modified proctor (ASTM D698) density as verified by the Contractor's geotechnical engineer (licensed in the province of British Columbia).

.2 The final surface of the backfill should be graded to direct surface water away from the road and structures. Final drainage direction should be confirmed with the Departmental Representative.

.5 Backfilled material must meet the compaction specification and will be independently tested by the Contractors geotechnical consultant. Any areas not meeting compaction specifications must be rectified at the Contractor's cost.

.6 Contractor must not proceed with backfilling operations unless approved by Departmental Representative.

2.2 Restoration

.1 Upon completion of Work, remove waste materials and debris, trim slopes and correct defects as directed by Departmental Representative.

.5 Clean and reinstate areas affected by Work as directed by Departmental Representative.

2.3 As-Built Survey

.1 The Contractor will be required to provide an as-built survey, completed by the Contractor's Surveyor, stamped and sealed by a qualified land surveyor registered in BC, following remediation that at minimum identifies the following:

.1 Excavation footprint and topography.

.2 New utility location(s).

.3 Decommissioned and/or abandoned utilities encountered,

.4 Utilities encountered not on current Drawings.

.5 Route of temporary fencing at the upland boundary of the Parcel 44 site.

END OF SECTION

APPENDIX A - TABLES

Parcel 44 Western Upland Portion Remediation Specification
Esquimalt, BC
SLR Project No.: 205.03757.00000

TABLE 1: 2008 SOIL CHEMISTRY RESULTS - METALS PARAMETERS (mg/kg) (page 1 of 1)

Sample ID	BH08-10A	BH08-10B	CCME	CSR
Date	**5-Feb-2008**	**5-Feb-2008**	**Residential**	**Residential**
Depth (m)	0.30-0.75	1.05-1.35	ng	ns
pH	6.40	6.44	ng	ns
Antimony	< 10	< 10	20	20
Arsenic	8.8	< 5	12	25
Barium	57.8	57.0	500	500
Beryllium	< 0.5	< 0.5	4	4
Cadmium	< 0.5	< 0.5	10	2 @ pH<7.0 3[+]
Chromium (total)	27.2	30.5	64	60
Cobalt	10.2	12.3	50	50
Copper	70.3[1]	66.4[1]	63	90 @ pH<5.0 100 @ pH>=5.0<5.5 150 @ pH>=5.5
Lead	< 30	< 30	140	150 @ pH<5.5 250 @ pH>=5.5<6.0 500 @ pH>=6.0
Mercury	0.0510	0.0685	6.6	15
Molybdenum	< 4	< 4	10	10
Nickel	21.1	25.1	50	100
Selenium	< 2*	< 2*	1	3
Silver	< 2	< 2	20	20
Thallium	< 1	< 1	1	ns
Tin	< 5	< 5	50	50
Vanadium	59.6	64.4	200	200
Zinc	118	74.2	200	150 @ pH<6.5 300 @ pH>=6.5<7.0 450 @ pH>=7.0

Notes:
m - metres
mg/kg - milligrams per dry kilogram
< - less than analytical detection limit indicated
ns - no standard listed
ng - no guideline listed
* - detection limit greater than the applicable standard
[+] - BC CSR, Schedule 4, Schedule 5 (intake of contaminated soil) and/or Schedule 10, Residential
[1] - Concentration exceeds CCME RL guidelines and/or CSR standards, but is below the Vancouver Island Regional background soil concentration as defined in MOE Protocol 4 (Determining Background Soil Quality)

Exceeds CCME RL: CCME Canadian Environmental Quality Guidelines for Soil, Residential/Parkland

Exceeds CSR RLm: BC CSR, Schedule 4, Schedule 5 (groundwater flow to surface water used by Marine Aquatic Life, includes mandatory site-specific factors)
and/or Schedule 10, Residential BC CSR, Schedules 4, 5 and/or 10, Residential

TABLE 2: 2008 SOIL CHEMISTRY RESULTS - PETROLEUM HYDROCARBON CONSTITUENTS AND MTBE (mg/kg)
(page 1 of 1)

Sample ID	BH08-10A	CCME	CSR
Date	**5-Feb-2008**	**Coarse Grained**	**Residential**
Depth (m)	0.30-0.75	ns	ns
HSVL (ppmv)	25	ns	ns
Benzene	---	0.0095	2.5
Ethylbenzene	---	0.082	1
Toluene	---	0.37	1.5
Xylenes	---	11	5
MTBE	---	ns	170
EPHs (C10-19)	< 200	ns	ns
EPHs (C19-32)	1010	ns	ns
LEPHs	---	ns	1000
HEPHs	---	ns	1000

Notes:
m - metres
mg/kg - milligrams per kilogram
HSVL (ppmv) - headspace vapour level (parts per million by volume)
< - less than analytical detection limit indicated
* - detection limit greater than the applicable standard
'---' - sample not analyzed for parameter indicated
MTBE - methyl tert-butyl ether
EPHs - extractable petroleum hydrocarbons
LEPHs - light extractable petroleum hydrocarbons (C10-19), excluding nine specific polycyclic aromatic hydrocarbon parameters
HEPHs - heavy extractable petroleum hydrocarbons (C19-32), excluding nine specific polycyclic aromatic hydrocarbon parameters
ns - no standard listed
ng - no guideline listed

Exceeds CCME RLCGs: CCME Canadian Soil Quality Guidelines for BTEX, Residential Coarse-grained Sub-surface (lowest of the human and environmental health guidelines and check values)

Exceeds CSR RLm: BC CSR, Schedule 4, Schedule 5 (groundwater flow to surface water used by Marine Aquatic Life, includes mandatory site-specific factors) and/or Schedule 10, Residential

TABLE 3: 2009 SOIL CHEMISTRY RESULTS - METALS PARAMETERS (mg/kg) (page 1 of 3)

Sample ID	MW09-50-1	MW09-50-3	MW09-50-4 (BFD of MW09-50-3)	MW09-50-6	TP09-69-3	TP09-69-4	CSR RLmw	CCME RL
Date	**18-Aug-2009**	**18-Aug-2009**	**18-Aug-2009**	**18-Aug-2009**	**8-Oct-2009**	**8-Oct-2009**		
Depth (m)	0-0.30	0.76-1.07	0.76-1.07	2.44-2.74	0.99-1.07	1.07-1.43	ns	ns
pH	7.44	7.45	7.33	7.27	7.38	7.86	ns	ns
Antimony	< 10	< 10	< 10	< 10	< 10	< 10	20	20
Arsenic	10.1	< 5.0	6.1	< 5.0	< 5.0	< 5.0	25	12
Barium	120	201	227	120	307	72.1	1000	500
Beryllium	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	4	4
Cadmium	< 0.50	0.83	< 0.50	< 0.50	< 0.50	< 0.50	2@pH<7.0 3.5@pH>=7.0<7.5 35@pH>=7.5	10
Chromium (total)	38.7	20.7	21.0	37.7	22.5	35.3	60	64
Cobalt	14.6	7.9	7.6	13.8	7.9	13.8	50	50
Copper	88.3*	**156**	69.0*	47.7	**1630**	83.2*	100@pH>=5.0<5.5 150@pH>=5.5 90@pH<5.0	63
Lead	< 30	139	137	67	49	83	150@pH<5.5 250@pH>=5.5<6.0 500@pH>=6.0	140
Mercury	0.102	0.429	0.452	0.109	0.0158	0.107	15	6.6
Molybdenum	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	10	10
Nickel	30.8	18.9	18.6	31.9	24.1	25.6	100	50
Selenium	< 2.0	< 2.0	< 3.0	< 2.0	< 2.0	< 2.0	3	1
Silver	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	20	20
Thallium	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	ns	1
Tin	< 5.0	12.7	14.7	7.8	**107**	< 5.0	50	50
Vanadium	97.9	45.9	45.0	85.6	48.5	89.6	200	130
Zinc	102	196	**314**	94.3	**260**	86.0	150@pH<6.5 300@pH>=6.5<7.0 450@pH>=7.0	200

Notes:
m - metres
mg/kg - milligrams per dry kilogram
< - less than analytical detection limit indicated
Exceeds CCME RL: CCME Canadian Environmental Quality Guidelines for Soil, Residential/Parkland
Exceeds CSR RLmw: BC CSR, Schedule 4, Schedule 5 (groundwater flow to surface water used by Marine Aquatic Life, includes mandatory site-specific factors) and/or Schedule 10, Residential
* Concentration is less than the BC MOE Regional Background Concentration for Vancouver Island, therefore is not considered an exceedance of CSR CL, CSR RL, and CSR CSRA standards and CCME IL guidelines

TABLE 3: 2009 SOIL CHEMISTRY RESULTS - METALS PARAMETERS (mg/kg) (page 2 of 3)

Sample ID	TP09-72-2	TP09-72-3 (BFD of TP09-72-2)	TP09-72-6	TP09-73-1	TP09-73-2	TP09-73-3	CSR RLmw	CCME RL
Date	**8-Oct-2009**	**8-Oct-2009**	**8-Oct-2009**	**8-Oct-2009**	**8-Oct-2009**	**8-Oct-2009**		
Depth (m)	0.76-1.06	0.76-1.06	2.29-2.44	0.15-0.45	0.76-1.06	1.45-1.60	ns	ns
pH	7.13	7.34	7.58	6.96	7.66	7.75	ns	ns
Antimony	< 10	< 10	< 10	< 10	< 10	< 10	20	20
Arsenic	**13.7**	**13.0**	< 5.0	8.1	< 5.0	9.8	25	12
Barium	156	198	70.9	102	89.1	180	1000	500
Beryllium	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	4	4
Cadmium	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	1.27	2@pH<7.0 3.5@pH>=7.0<7.5 35@pH>=7.5	10
Chromium (total)	42.6	42.4	44.8	34.5	36.2	43.3	60	64
Cobalt	13.2	13.5	15.3	13.2	14.7	12.5	50	50
Copper	142*	149*	52	80.3*	77.7*	**416**	100@pH>=5.0<5.5 150@pH>=5.5 90@pH<5.0	63
Lead	95	76	< 30	39	< 30	97	150@pH<5.5 250@pH>=5.5<6.0 500@pH>=6.0	140
Mercury	0.293	0.257	0.0579	0.225	0.0820	0.196	15	6.6
Molybdenum	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	10	10
Nickel	29.6	31.6	31.8	23.6	25.1	30.0	100	50
Selenium	< 2.0	< 2.0	< 0.50	< 3.0	< 2.0	< 2.0	3	1
Silver	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	20	20
Thallium	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	ns	1
Tin	< 5.0	8.8	< 5.0	< 5.0	< 5.0	6.5	50	50
Vanadium	70.8	73.2	94.1	79.2	90.2	68.9	200	130
Zinc	**236**	**282**	64.7	119	56.8	**610**	150@pH<6.5 300@pH>=6.5<7.0 450@pH>=7.0	200

Notes:
m - metres
mg/kg - milligrams per dry kilogram
< - less than analytical detection limit indicated
Exceeds CCME RL: CCME Canadian Environmental Quality Guidelines for Soil, Residential/Parkland
Exceeds CSR RLmw: BC CSR, Schedule 4, Schedule 5 (groundwater flow to surface water used by Marine Aquatic Life, includes mandatory site-specific factors) and/or Schedule 10, Residential
* Concentration is less than the BC MOE Regional Background Concentration for Vancouver Island, therefore is not considered an exceedance of CSR CL, CSR RL, and CSR CSRA standards and CCME IL guidelines.

TABLE 3: 2009 SOIL CHEMISTRY RESULTS - METALS PARAMETERS (mg/kg) (page 3 of 3)

Sample ID	TP09-74-1	TP09-74-3	MW09-74-4	SS-14	SS-15	CSR RLmw	CCME RL
Date	8-Oct-2009	8-Oct-2009	8-Oct-2009	8-Oct-2009	8-Oct-2009		
Depth (m)	0.61-0.91	1.12-1.20	1.98-2.13	0-0.10	0-0.10	ns	ns
pH	6.00	8.49	7.89	6.38	6.02	ns	ns
Antimony	< 10	< 10	< 10	< 10	< 10	20	20
Arsenic	< 5.0	11.3	7.8	9.9	< 5.0	25	12
Barium	64.8	111	222	175	81.6	1000	500
Beryllium	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	4	4
Cadmium	< 0.50	< 0.50	0.74	0.75	< 0.50	2@pH<7.0 3.5@pH>=7.0<7.5 35@pH>=7.5	10
Chromium (total)	28.6	33.5	41.8	40.3	32.9	60	64
Cobalt	8.8	10.8	11.6	14.6	14.3	50	50
Copper	50.5	51.3	**219**	**197**	62.7	100@pH>=5.0<5.5 150@pH>=5.5 90@pH<5.0	63
Lead	< 30	129	**171**	78	< 30	150@pH<5.5 250@pH>=5.5<6.0 500@pH>=6.0	140
Mercury	0.0533	0.0128	0.298	0.133	0.0540	15	6.6
Molybdenum	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	10	10
Nickel	17.3	20.0	29.9	33.2	25.8	100	50
Selenium	< 3.0	< 2.0	< 2.0	< 2.0	< 2.0	3	1
Silver	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	20	20
Thallium	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	ns	1
Tin	< 5.0	< 5.0	8.0	6.9	< 5.0	50	50
Vanadium	61.3	84.7	69.4	82.5	94.4	200	130
Zinc	58.4	110	**575**	**315**	84.2	150@pH<6.5 300@pH>=6.5<7.0 450@pH>=7.0	200

Notes:
m - metres
mg/kg - milligrams per dry kilogram
< - less than analytical detection limit indicated
Exceeds CCME RL: CCME Canadian Environmental Quality Guidelines for Soil, Residential/Parkland
Exceeds CSR RLmw: BC CSR, Schedule 4, Schedule 5 (groundwater flow to surface water used by Marine Aquatic Life, includes mandatory site-specific factors) and/or Schedule 10, Residential
* Concentration is less than the BC MOE Regional Background Concentration for Vancouver Island, therefore is not considered an exceedance of CSR CL, CSR RL, and CSR CSRA standards and CCME IL guidelines.

TABLE 4: 2009 SOIL CHEMISTRY RESULTS - PAH PARAMETERS (mg/kg) (page 1 of 1)

Sample ID	MW09-50-3	MW09-50-4	TP09-69-3	TP09-74-3	MW09-74-4	SS-14	CCME RLe	CSR RLmw
Date	18-Aug-2009	18-Aug-2009	8-Oct-2009	8-Oct-2009	8-Oct-2009	8-Oct-2009		
Depth (m)	0.76-1.07	0.76-1.07	0.99-1.07	1.12-1.20	1.98-2.13	0-0.1	ns	ns
Acenaphthene	< 0.0050	0.0115	< 0.0060	0.0160	0.0346	< 0.0060	ns	ns
Acenaphthylene	0.0074	0.0085	< 0.0060	0.0245	0.0177	< 0.0050	ns	ns
Anthracene	0.0096	0.0298	0.0165	0.0426	0.0499	0.0151	2.5	ns
Benzo(a)anthracene	0.022	0.068	< 0.020	0.031	0.043	0.031	ns	1
Benzo(a)pyrene	0.022	0.064	< 0.010	< 0.030	0.019	< 0.010	20	1
Benzo(b)fluoranthene	0.036	0.092	0.026	0.053	0.038	0.060	ns	1
Benzo(g,h,i)perylene	0.034	0.065	< 0.010	0.012	0.011	< 0.010	ns	ns
Benzo(k)fluoranthene	0.011	0.028	< 0.010	0.015	< 0.010	0.011	ns	1
Chrysene	0.035	0.083	< 0.030	0.052	0.063	0.068	ns	ns
Dibenzo(a,h)anthracene	< 0.0050	0.0104	< 0.0050	< 0.0050	< 0.0050	< 0.0050	ns	1
Fluoranthene	0.046	0.151	0.070	0.109	0.241	0.203	50	ns
Fluorene	< 0.010	0.015	< 0.020	0.056	0.043	< 0.010	ns	ns
Indeno(1,2,3-c,d)pyrene	0.026	0.059	< 0.010	0.013	0.011	< 0.010	ns	1
2-Methylnaphthalene	0.023	0.024	0.044	0.129	0.166	0.027	ns	ns
Naphthalene	0.032	0.035	0.182	0.203	0.389	0.106	ns	5
Phenanthrene	0.044	0.129	0.242	0.200	0.452	0.204	ns	5
Pyrene	0.051	0.155	< 0.070	0.099	0.195	0.109	ns	10

Notes:
m - metres
PAH - polycyclic aromatic hydrocarbons
mg/kg - milligrams per dry kilogram
< - less than analytical detection limit indicated
ns - no standard listed
Exceeds CCME RLe: CCME Canadian Soil Quality Guidelines for PAH, Residential/Parkland, Environmental Health
Exceeds CSR RLmw: BC CSR, Schedule 4, Schedule 5 (groundwater flow to surface water used by Marine Aquatic Life, includes mandatory site-specific factors) and/or Schedule 10, Residential

Table 5: 2009 REMEDIATION SOIL CHEMISTRY RESULTS - METALS PARAMETERS (mg/kg) (page 1 of 2)

Sample ID	CW-242	CW-243	CW-244	CW-263	CW-265	CW-267	CW-268	CW-269	CW-270	CCME RL
Date	24-Nov-2010	24-Nov-2010	24-Nov-2010	26-Nov-2010	26-Nov-2010	26-Nov-2010	29-Nov-2010	29-Nov-2010	29-Nov-2010	
Depth (m)	0-0.5	0.5-0.9	0.9-1.5	0.5-1.25	0.7-1.4	0-0.3	0.3-1.2	0-0.2	0.4-1.1	ns
pH	7.08	7.79	7.20	7.78	8.08	7.44	7.44	7.08	7.41	>6<8
Antimony	2.74	0.17	0.98	1.86	0.81	2.59	0.85	2.30	0.93	20
Arsenic	10.4	3.77	8.29	6.33	5.55	7.02	6.84	7.34	8.21	12
Barium	86.3	70.1	301	146	126	92.8	217	58.2	195	500
Beryllium	0.34	0.30	0.58	0.21	0.37	0.24	0.40	< 0.20	0.29	4
Cadmium	0.22	< 0.10	2.42	0.89	0.32	0.26	1.08	0.23	0.96	10
Chromium (total)	34.0	31.1	43.6	22.4	35.7	30.7	31.9	29.4	26.1	64
Cobalt	13.8	10.8	11.9	7.56	13.1	10.0	11.1	11.3	9.62	50
Copper	63.3[1]	39.2	72.1[1]	68.6[1]	69.5[1]	58.7	71.1[1]	69.8[1]	59.3	63
Lead	26.3	4.32	**172**	51.4	58.0	45.7	92.7	26.5	133	140
Mercury	0.0861	0.0367	0.518	0.222	0.159	0.191	0.467	0.0912	0.499	6.6
Molybdenum	1.07	< 0.50	0.58	0.75	0.76	1.04	0.63	0.70	< 0.50	10
Nickel	26.8	21.1	39.8	17.9	27.8	23.7	29.7	24.3	23.8	50
Selenium	0.24	< 0.20	0.72	0.51	0.28	0.25	0.51	< 0.20	0.50	1
Silver	< 0.10	< 0.10	0.41	0.15	0.11	< 0.10	< 0.40	< 0.10	< 0.50	20
Thallium	0.074	< 0.050	0.231	0.081	0.097	0.080	0.057	< 0.050	< 0.050	1
Tin	2.2	< 2.0	34.5	7.0	9.6	5.6	9.2	2.5	14.6	50
Uranium	0.400	0.343	0.902	0.486	0.455	0.356	0.610	0.256	0.469	23
Vanadium	81.1	81.6	65.3	41.9	80.2	61.9	58.9	76.6	53.0	130
Zinc	105	36.1	**437**	176	125	108	**229**	83.3	**204**	200

Notes:
m - metres
mg/kg - milligrams per dry kilogram
< - less than analytical detection limit indicated
'---' - sample not analyzed for parameter indicated
ns - no standard listed
BFD - Blind Field Duplicate
Exceeds CCME RL: CCME Canadian Environmental Quality Guidelines, Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health, Residential/Parkland
[1] Exceeds CCME RL Guidelines but below BC CSR Protocol 4: Regional Background Soil Quality Value for one or more of the following parameters: Chromium, Copper, Nickel, Vanadium

Table 5: 2009 REMEDIATION SOIL CHEMISTRY RESULTS - METALS PARAMETERS (mg/kg) (page 2 of 2)

Sample ID	CW-271	CW-272	CW-273	CW-274	CW-499	CW-500	CW-501 (BFD of CW-500)	CW-502	CW-503	CCME RL
Date	29-Nov-2010	29-Nov-2010	29-Nov-2010	29-Nov-2010	22-Dec-10	22-Dec-10	22-Dec-10	22-Dec-10	22-Dec-10	
Depth (m)	0-0.3	1.1-1.4	0.5-1.1	0-0.2	1.3-1.8	0.6-1.1	0.6-1.1	0.25-0.5	0-0.25	ns
pH	7.58	7.11	7.33	6.34	7.81	7.01	7.00	6.98	6.76	>6<8
Antimony	3.11	0.68	0.21	0.58	2.99	0.20	0.21	0.15	0.95	20
Arsenic	9.98	5.66	4.87	4.90	5.50	4.93	5.08	4.13	4.50	12
Barium	77.3	95.8	77.2	69.7	135	74.9	80.7	68.8	66.4	500
Beryllium	0.28	0.28	0.38	0.25	0.22	0.33	0.34	0.26	0.23	4
Cadmium	0.19	0.28	< 0.10	0.21	0.78	< 0.10	< 0.10	0.10	0.19	10
Chromium (total)	37.3	28.9	36.6	32.4	30.9	31.8	34.6	28.9	28.1	64
Cobalt	13.6	11.6	14.6	13.8	11.3	14.7	15.8	14.3	12.1	50
Copper	69.7[1]	72.1[1]	72.9[1]	62.4	110[1]	67.9[1]	70.9[1]	76.6[1]	70.6[1]	63
Lead	22.7	36.6	4.13	14.5	53.7	5.36	6.05	3.58	26.3	140
Mercury	0.0744	0.143	0.0405	0.0863	0.143	0.0339	0.0365	0.0241	0.117	6.6
Molybdenum	0.76	0.64	< 0.50	0.86	1.86	< 0.50	< 0.50	< 0.50	1.32	10
Nickel	26.7	25.5	28.1	26.5	26.2	27.8	29.9	26.7	24.6	50
Selenium	0.22	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	1
Silver	< 0.10	< 0.20	< 0.10	< 0.10	0.18	< 0.10	< 0.10	< 0.10	< 0.10	20
Thallium	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	1
Tin	< 2.0	16.8	< 2.0	< 2.0	4.3	< 2.0	< 2.0	< 2.0	< 2.0	50
Uranium	0.415	0.354	0.302	0.267	0.559	0.276	0.293	0.216	0.253	23
Vanadium	86.5	77.8	96.0	87.4	69.5	92.3	93.0	81.9	65.0	130
Zinc	87.1	140	46.4	66.8	**252**	51.5	55.8	45.3	83.9	200

Notes:
m - metres
mg/kg - milligrams per dry kilogram
< - less than analytical detection limit indicated
'---' - sample not analyzed for parameter indicated
ns - no standard listed
BFD - Blind Field Duplicate
Exceeds CCME RL: CCME Canadian Environmental Quality Guidelines, Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health, Residential/Parkland
[1] Exceeds CCME RL Guidelines but below BC CSR Protocol 4: Regional Background Soil Quality Value for one or more of the following parameters: Chromium, Copper, Nickel, Vanadium

Table 6: 2009 REMEDIATION SOIL CHEMISTRY RESULTS - PAH PARAMETERS (mg/kg) (page 1 of 1)

Sample ID	CW-268	CW-269	CW-270	CW-271	CW-272	CCME RLsc	CCME RLsf	CCME RLi	CCME RLe
Date	29-Nov-2010	29-Nov-2010	29-Nov-2010	29-Nov-2010	29-Nov-2010				
Depth (m)	0.3-1.2	0-0.2	0.4-1.1	0-0.3	1.1-1.4	ns	ns	ns	ns
Acenaphthene	0.0180	< 0.0050	< 0.0050	< 0.010	< 0.0050	ns	21.5	ns	ns
Acenaphthylene	0.0157	0.0076	0.0062	0.0771	0.0087	ns	ns	ns	ns
Anthracene	0.0181	0.0075	0.0082	0.0851	0.0132	2.5	61.5	ns	2.5
Benzo(a)anthracene	0.027	0.014	0.022	0.097	0.022	ns	6.2	1	ns
Benzo(a)pyrene	0.025	0.022	0.027	0.171	0.017	20	0.6	ns	20
Benzo(b)fluoranthene	0.034	0.039	0.035	0.194	0.021	ns	6.2	1	ns
Benzo(g,h,i)perylene	0.020	0.015	0.028	0.096	0.011	ns	ns	ns	ns
Benzo(k)fluoranthene	0.011	0.011	0.011	0.070	< 0.010	ns	6.2	1	ns
Chrysene	0.036	0.020	0.029	0.126	0.028	ns	6.2	ns	ns
Dibenzo(a,h)anthracene	< 0.0050	< 0.0050	< 0.0050	0.0272	< 0.0050	ns	ns	1	ns
Fluoranthene	0.072	0.026	0.042	0.134	0.055	50	15.4	ns	50
Fluorene	0.019	< 0.010	< 0.010	0.013	< 0.010	ns	15.4	ns	ns
Indeno(1,2,3-c,d)pyrene	0.017	0.018	0.024	0.127	< 0.010	ns	ns	1	ns
2-Methylnaphthalene	0.052	< 0.010	0.017	< 0.010	0.022	ns	ns	ns	ns
Naphthalene	0.116	< 0.010	0.025	< 0.020	0.051	ns	8.8	ns	0.6
Phenanthrene	0.125	0.015	0.035	0.082	0.085	ns	43	5	ns
Pyrene	0.078	0.023	0.050	0.132	0.064	ns	7.7	10	ns

Notes:
m - metres
PAH - polycyclic aromatic hydrocarbons
mg/kg - milligrams per dry kilogram
< - less than analytical detection limit indicated
'---' - sample not analyzed for parameter indicated
ns - no standard/guideline listed
Exceeds CCME RLsc: CCME Canadian Soil Quality Guidelines for PAH, Residential/Parkland, Environmental Health guidelines, Soil Contact
Exceeds CCME RLsf: CCME Canadian Soil Quality Guidelines for PAH, Residential/Parkland, Environmental Health guidelines, Soil and Food Ingestion
Exceeds CCME RLi: CCME Canadian Soil Quality Guidelines for PAH, Residential/Parkland, Environmental Health guidelines, Interim Soil Quality Criteria (CCME 1991)
Exceeds CCME RLe: CCME Canadian Soil Quality Guidelines for PAH, Residential/Parkland, Environmental Health guidelines, Environmental Health

TABLE 7: 2015 SOIL CHEMISTRY RESULTS - METALS PARAMETERS (mg/kg) (page 1 of 2)

Sample ID	TP15-07-E (BFD of TP15-17-D)	TP15-07-G	TP15-08-B	TP15-09-B	CSR NL	CSR RLfw	CSR CLfw	CCME CL
Date	**28-May-2015**	**28-May-2015**	**28-May-2015**	**28-May-2015**				
Depth (m)	**2.74 - 3.66**	**4.57 - 5.18**	**0.91 - 1.83**	**0.91 - 1.83**				
pH	7.33	7.29	7.73	7.96	ns	ns	ns	ns
Aluminum	16100	24700	18500	15800	ns	ns	ns	ns
Antimony	0.85	0.60	6.20	3.88	20	20	40	40
Arsenic	4.90	4.71	6.55	***98.6***	15	20	20	12
Barium	97.4	108	181	190	400	1000	1500	2000
Beryllium	< 0.40	0.49	< 0.40	< 0.40	4	4	8	8
Bismuth	< 0.10	< 0.10	0.10	< 0.10	ns	ns	ns	ns
Cadmium	0.505	0.298	0.759	0.815	1.5	2@pH<7.0 2.5@pH>=7.0<7.5 25@pH>=7.5<8.0 35@pH>=8.0	2@pH<7.0 2.5@pH>=7.0<7.5 25@pH>=7.5<8.0 100@pH>=8.0	22
Chromium (total)	27.4	41.1	35.7	22.6	60	300	700	87
Cobalt	10.6	15.0	10.5	7.07	50	50	300	300
Copper	56.3	42.9	*118*	73.0	90	90@pH<5.0 100@pH>=5.0<5.5 150@pH>=5.5	90@pH<5.0 100@pH>=5.0<5.5 200@pH>=5.5<6.0 250@pH>=6.0	91
Iron	23600	32700	32900	20900	ns	ns	ns	ns
Lead	57.7	30.9	174	70.3	100	150@pH<5.5 250@pH>=5.5<6.0 400@pH>=6.0	150@pH<5.5 250@pH>=5.5<6.0 700@pH>=6.0	260
Lithium	11.2	17.4	14.3	9.2	ns	1600	20000	ns
Magnesium	6450	9170	8520	5300	ns	ns	ns	ns
Manganese	464	435	916	749	ns	1800	ns	ns
Mercury	1.73	0.346	0.894	0.338	15	15	40	24
Molybdenum	0.82	0.68	2.05	1.01	10	10	40	40
Nickel	23.4	31.6	31.1	23.7	100	100	500	50
Selenium	< 0.50	< 0.50	< 0.50	< 0.50	3	3	10	2.9
Silver	0.828	0.077	0.200	0.272	20	20	40	40
Strontium	76.7	60.8	169	404	ns	47000	100000	ns
Thallium	< 0.050	0.061	< 0.050	< 0.050	ns	ns	ns	1
Tin	4.41	2.64	8.89	6.19	50	50	300	300
Titanium	777	955	878	418	ns	ns	ns	ns
Uranium	0.388	0.503	0.822	0.485	ns	16	200	33
Vanadium	53.3	84.1	59.3	39.4	200	200	ns	130
Zinc	148	91.9	265	193	150	150@pH<6.0 300@pH>=6.0<6.5 450@pH>=6.5	150@pH<6.0 300@pH>=6.0<6.5 600@pH>=6.5	360

Notes:
m - metres
mg/kg - milligrams per dry kilogram
< - less than analytical detection limit indicated
* Value is less than Vancouver Island regional background level as per CSR Protocol 4, therefore it is not considered an exceedence of CCME guidelines or CSR standards
ns - no standard listed

ITALICS	Exceeds CSR NL: BC Contaminated Sites Regulation, Schedule 7, Standards Triggering Contaminated Soil Relocation Agreements, Soil Relocation to Nonagricultural Land
UNDERLINED	Exceeds CSR RLfw: BC Contaminated Sites Regulation, Schedule 4, Schedule 5 (groundwater flow to surface water used by Freshwater Aquatic Life, includes mandatory site-specific factors) and/or Schedule 10, Residential
BOLD	Exceeds CSR CLfw: BC Contaminated Sites Regulation, Schedule 4, Schedule 5 (groundwater flow to surface water used by Freshwater Aquatic Life, includes mandatory site-specific factors) and/or Schedule 10, Commercial
SHADE	Exceeds CCME CL: CCME Canadian Environmental Quality Guidelines, Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health, Commercial

TABLE 7: 2015 SOIL CHEMISTRY RESULTS - METALS PARAMETERS (mg/kg) (page 2 of 2)

Sample ID	TP15-09-C (BFD of TP15-09-B)	TP15-09-E	TP15-10-B	TP15-10-C	CSR NL	CSR RLfw	CSR CLfw	CCME CL
Date	**28-May-2015**	**28-May-2015**	**28-May-2015**	**28-May-2015**				
Depth (m)	**0.91 - 1.83**	**2.74 - 3.66**	**0.91 - 1.83**	**1.83 - 2.74**				
pH	7.90	8.09	8.06	8.43	ns	ns	ns	ns
Aluminum	17400	22400	21700	19900	ns	ns	ns	ns
Antimony	4.99	0.27	2.84	0.27	20	20	40	40
Arsenic	***120***	4.23	6.04	5.25	15	20	20	12
Barium	223	72.4	160	78.0	400	1000	1500	2000
Beryllium	< 0.40	0.43	< 0.40	0.41	4	4	8	8
Bismuth	< 0.10	< 0.10	< 0.10	< 0.10	ns	ns	ns	ns
Cadmium	0.879	0.252	0.491	0.225	1.5	2@pH<7.0 2.5@pH>=7.0<7.5 25@pH>=7.5<8.0 35@pH>=8.0	2@pH<7.0 2.5@pH>=7.0<7.5 25@pH>=7.5<8.0 100@pH>=8.0	22
Chromium (total)	20.2	43.2	39.0	36.9	60	300	700	87
Cobalt	7.19	14.7	11.9	13.1	50	50	300	300
Copper	72.4	50.9	*128*	44.9	90	90@pH<5.0 100@pH>=5.0<5.5 150@pH>=5.5	90@pH<5.0 100@pH>=5.0<5.5 200@pH>=5.5<6.0 250@pH>=6.0	91
Iron	20400	31900	30100	29800	ns	ns	ns	ns
Lead	79.8	7.79	99.7	11.3	100	150@pH<5.5 250@pH>=5.5<6.0 400@pH>=6.0	150@pH<5.5 250@pH>=5.5<6.0 700@pH>=6.0	260
Lithium	9.7	18.7	12.7	15.3	ns	1600	20000	ns
Magnesium	5570	10200	8460	7990	ns	ns	ns	ns
Manganese	719	522	684	486	ns	1800	ns	ns
Mercury	0.361	< 0.050	0.236	0.069	15	15	40	24
Molybdenum	0.69	0.25	1.03	0.32	10	10	40	40
Nickel	22.0	37.5	29.6	31.4	100	100	500	50
Selenium	0.58	< 0.50	< 0.50	< 0.50	3	3	10	2.9
Silver	0.189	0.092	0.174	0.084	20	20	40	40
Strontium	546	46.5	131	54.7	ns	47000	100000	ns
Thallium	< 0.050	0.054	< 0.050	0.059	ns	ns	ns	1
Tin	7.23	0.48	11.6	1.25	50	50	300	300
Titanium	414	1020	1000	900	ns	ns	ns	ns
Uranium	0.485	0.359	0.554	0.282	ns	16	200	33
Vanadium	38.8	78.9	71.2	71.8	200	200	ns	130
Zinc	207	69.4	218	69.8	150	150@pH<6.0 300@pH>=6.0<6.5 450@pH>=6.5	150@pH<6.0 300@pH>=6.0<6.5 600@pH>=6.5	360

Notes:
m - metres
mg/kg - milligrams per dry kilogram
< - less than analytical detection limit indicated
* Value is less than Vancouver Island regional background level as per CSR Protocol 4, therefore it is not considered an exceedence of CCME guidelines or CSR standards
ns - no standard listed

ITALICS	Exceeds CSR NL: BC Contaminated Sites Regulation, Schedule 7, Standards Triggering Contaminated Soil Relocation Agreements, Soil Relocation to Nonagricultural Land
UNDERLINED	Exceeds CSR RLfw: BC Contaminated Sites Regulation, Schedule 4, Schedule 5 (groundwater flow to surface water used by Freshwater Aquatic Life, includes mandatory site-specific factors) and/or Schedule 10, Residential
BOLD	Exceeds CSR CLfw: BC Contaminated Sites Regulation, Schedule 4, Schedule 5 (groundwater flow to surface water used by Freshwater Aquatic Life, includes mandatory site-specific factors) and/or Schedule 10, Commercial
SHADE	Exceeds CCME CL: CCME Canadian Environmental Quality Guidelines, Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health, Commercial

TABLE 8: 2015 SOIL CHEMISTRY RESULTS - PAH PARAMETERS (mg/kg) (page 1 of 2)

Sample ID	TP15-08-B	TP15-09-B	TP15-09-C (BFD of TP15-09-B)	CSR NL	CSR RLfw	CSR CLfw	CCME CLe	CCME CLi	CCME CLfl	CCME CLsc	CCME TPE
Date	**28-May-2015**	**28-May-2015**	**28-May-2015**								
Depth (m)	**0.91 - 1.83**	**0.91 - 1.83**	**0.91 - 1.83**								
Acenaphthene	0.010	0.014	0.034	ns	ns	ns	ns	ns	0.28	ns	ns
Acenaphthylene	0.026	0.012	0.021	ns	ns	ns	ns	ns	320	ns	ns
Anthracene	0.010	< 0.015	0.039	ns	ns	ns	32	ns	ns	32	ns
Benzo(a)anthracene	< 0.020	< 0.020	0.026	1	1	10	ns	10	ns	ns	ns
Benzo(a)pyrene	< 0.020	< 0.020	< 0.020	1	1	10	72	ns	8800	72	ns
Benzo(b)fluoranthene	< 0.020	< 0.020	< 0.020	1	1	10	ns	10	ns	ns	ns
Benzo(g,h,i)perylene	< 0.050	< 0.050	< 0.050	ns	ns	ns	ns	ns	ns	ns	ns
Benzo(k)fluoranthene	< 0.020	< 0.020	< 0.020	1	1	10	ns	10	ns	ns	ns
Chrysene	< 0.020	< 0.020	0.041	ns	ns	ns	ns	ns	ns	ns	ns
Dibenz(a,h)anthracene	< 0.050	< 0.050	< 0.050	1	1	10	ns	10	ns	ns	ns
Fluoranthene	0.12	0.081	0.19	ns	ns	ns	180	ns	ns	180	ns
Fluorene	< 0.020	< 0.020	0.037	ns	ns	ns	ns	ns	0.25	ns	ns
Indeno(1,2,3-c,d)pyrene	< 0.050	< 0.050	< 0.050	1	1	10	ns	10	ns	ns	ns
2-Methylnaphthalene	0.047	0.064	0.12	ns	ns	ns	ns	ns	ns	ns	ns
Naphthalene	0.27	0.10	0.45	5	5	50	22	ns	0.013	ns	ns
Phenanthrene	0.11	0.11	0.29	5	5	50	ns	50	0.046	ns	ns
Pyrene	0.13	0.071	0.15	10	10	100	ns	100	ns	ns	ns
Benzo(a)pyrene Equivalency	< 0.10	< 0.10	< 0.10	ns	ns	ns	ns	ns	ns	ns	5.3

Notes:
m - metres
PAH - polycyclic aromatic hydrocarbons
mg/kg - milligrams per dry kilogram
< - less than analytical detection limit indicated
'---' - sample not analyzed for parameter indicated
ns - no standard/guideline listed
TPE - Total Potency Equivalency (1X10-5). This is only applicable in the top 1.5m

ITALICS	Exceeds CSR NL: BC Contaminated Sites Regulation, Schedule 7, Standards Triggering Contaminated Soil Relocation Agreements, Soil Relocation to Nonagricultural Land
UNDERLINED	Exceeds CSR RLfw: BC Contaminated Sites Regulation, Schedule 4, Schedule 5 (groundwater flow to surface water used by Freshwater Aquatic Life, includes mandatory site-specific factors) and/or Schedule 10, Residential
BOLD	Exceeds CSR CLfw: BC Contaminated Sites Regulation, Schedule 4, Schedule 5 (groundwater flow to surface water used by Freshwater Aquatic Life, includes mandatory site-specific factors) and/or Schedule 10, Commercial
SHADE	Exceeds CCME CLe: CCME Canadian Soil Quality Guidelines for PAH, Commercial, Environmental Health guidelines, Environmental Health
SHADE	Exceeds CCME CLi: CCME Canadian Soil Quality Guidelines for PAH, Commerical, Environmental Health guidelines, Interim Soil Quality Criteria (CCME 1991)
SHADE	Exceeds CCME CLfl: CCME Canadian Soil Quality Guidelines for PAH, Commercial, Environmental Health guidelines, Protection of Freshwater Life
SHADE	Exceeds CCME CLsc: CCME Canadian Soil Quality Guidelines for PAH, Commercial, Environmental Health guidelines, Soil Contact
SHADE	Exceeds CCME TPE: CCME Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health - TPE Calculation

TABLE 8: 2015 SOIL CHEMISTRY RESULTS - PAH PARAMETERS (mg/kg) (page 2 of 2)

Sample ID	TP15-09-E	TP15-10-B	TP15-10-C	CSR NL	CSR RLfw	CSR CLfw	CCME CLe	CCME CLi	CCME CLfl	CCME CLsc	CCME TPE
Date	28-May-2015	28-May-2015	28-May-2015								
Depth (m)	2.74 - 3.66	0.91 - 1.83	1.83 - 2.74								
Acenaphthene	< 0.0050	0.019	< 0.0050	ns	ns	ns	ns	ns	0.28	ns	ns
Acenaphthylene	< 0.0050	0.015	< 0.0050	ns	ns	ns	ns	ns	320	ns	ns
Anthracene	< 0.0040	0.030	< 0.0040	ns	ns	ns	32	ns	ns	32	ns
Benzo(a)anthracene	< 0.020	0.037	< 0.020	1	1	10	ns	10	ns	ns	ns
Benzo(a)pyrene	< 0.020	< 0.020	< 0.020	1	1	10	72	ns	8800	72	ns
Benzo(b)fluoranthene	< 0.020	0.020	< 0.020	1	1	10	ns	10	ns	ns	ns
Benzo(g,h,i)perylene	< 0.050	< 0.050	< 0.050	ns	ns	ns	ns	ns	ns	ns	ns
Benzo(k)fluoranthene	< 0.020	< 0.020	< 0.020	1	1	10	ns	10	ns	ns	ns
Chrysene	< 0.020	0.050	< 0.020	ns	ns	ns	ns	ns	ns	ns	ns
Dibenz(a,h)anthracene	< 0.050	< 0.050	< 0.050	1	1	10	ns	10	ns	ns	ns
Fluoranthene	< 0.020	0.13	< 0.020	ns	ns	ns	180	ns	ns	180	ns
Fluorene	< 0.020	0.024	< 0.020	ns	ns	ns	ns	ns	0.25	ns	ns
Indeno(1,2,3-c,d)pyrene	< 0.050	< 0.050	< 0.050	1	1	10	ns	10	ns	ns	ns
2-Methylnaphthalene	< 0.020	0.052	< 0.020	ns	ns	ns	ns	ns	ns	ns	ns
Naphthalene	< 0.010	0.11	< 0.010	5	5	50	22	ns	0.013	ns	ns
Phenanthrene	< 0.020	0.17	< 0.020	5	5	50	ns	50	0.046	ns	ns
Pyrene	< 0.020	0.14	< 0.020	10	10	100	ns	100	ns	ns	ns
Benzo(a)pyrene Equivalency	< 0.10	< 0.10	< 0.10	ns	ns	ns	ns	ns	ns	ns	5.3

Notes:
m - metres
PAH - polycyclic aromatic hydrocarbons
mg/kg - milligrams per dry kilogram
< - less than analytical detection limit indicated
'---' - sample not analyzed for parameter indicated
ns - no standard/guideline listed
TPE - Total Potency Equivalency (1X10-5). This is only applicable in the top 1.5m

ITALICS	Exceeds CSR NL: BC Contaminated Sites Regulation, Schedule 7, Standards Triggering Contaminated Soil Relocation Agreements, Soil Relocation to Nonagricultural Land
UNDERLINED	Exceeds CSR RLfw: BC Contaminated Sites Regulation, Schedule 4, Schedule 5 (groundwater flow to surface water used by Freshwater Aquatic Life, includes mandatory site-specific factors) and/or Schedule 10, Residential
BOLD	Exceeds CSR CLfw: BC Contaminated Sites Regulation, Schedule 4, Schedule 5 (groundwater flow to surface water used by Freshwater Aquatic Life, includes mandatory site-specific factors) and/or Schedule 10, Commercial
SHADE	Exceeds CCME CLe: CCME Canadian Soil Quality Guidelines for PAH, Commercial, Environmental Health guidelines, Environmental Health
SHADE	Exceeds CCME CLi: CCME Canadian Soil Quality Guidelines for PAH, Commerical, Environmental Health guidelines, Interim Soil Quality Criteria (CCME 1991)
SHADE	Exceeds CCME CLfl: CCME Canadian Soil Quality Guidelines for PAH, Commercial, Environmental Health guidelines, Protection of Freshwater Life
SHADE	Exceeds CCME CLsc: CCME Canadian Soil Quality Guidelines for PAH, Commercial, Environmental Health guidelines, Soil Contact
SHADE	Exceeds CCME TPE: CCME Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health - TPE Calculation

TABLE 9: 2015 SOIL CHEMISTRY RESULTS - SALINITY PARAMETERS (mg/kg) (page 1 of 1)

Sample ID	TP15-09-B	TP15-09-C (BFD of TP15-09-B)	CSR NL	CSR RLfw	CSR ILfw	CCME CL
Date	28-May-2015	28-May-2015				
Depth (m)	0.91 - 1.83	0.91 - 1.83				
Calculated Chloride	***859***	***918***	35	350	550	ns
Calculated Sodium	*456*	*501*	200	200	1000	ns

Notes:
mg/kg - milligrams per kilogram
< - less than analytical detection limit indicated
'---' - sample not analyzed for parameter indicated
ns - no standard listed

ITALICS	Exceeds CSR NL: BC Contaminated Sites Regulation, Schedule 7, Standards Triggering Contaminated Soil Relocation Agreements, Soil Relocation to Nonagricultural Land
UNDERLINED	Exceeds CSR RLfw: BC Contaminated Sites Regulation, Schedule 4, Schedule 5 (groundwater flow to surface water used by Freshwater Aquatic Life, includes mandatory site-specific factors) and/or Schedule 10, Residential
BOLD	Exceeds CSR ILfw: BC Contaminated Sites Regulation, Schedule 4, Schedule 5 (groundwater flow to surface water used by Freshwater Aquatic Life, includes mandatory site-specific factors) and/or Schedule 10, Industrial
SHADE	Exceeds CCME CL: CCME Canadian Environmental Quality Guidelines, Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health, Commercial

TABLE 10: GOLDER 2015 SOIL CHEMISTRY RESULTS - METALS PARAMETERS (mg/kg) (page 1 of 1)

Borehole ID	BH15-21	BH15-34	BH15-34	BH15-35	BH15-36	CCME CL
Sample ID	00918-08	00921-01	00921-03	00921-05	00921-08	
Date	09-Sep-2015	14-Sep-2015	14-Sep-2015	14-Sep-2015	14-Sep-2015	
Depth (m)	1.07 - 1.22	0.91 - 1.07	2.44 - 2.59	1.22 - 1.37	1.83 - 1.98	ns
pH	6.58	7.54	7.75	**5.26**	6.66	>6<8
Aluminum	16800	16800	20900	19100	16500	ns
Antimony	0.44	2.67	2.20	0.29	3.46	40
Arsenic	5.42	8.15	7.71	2.22	10.8	12
Barium	70.8	135	144	49.1	214	2000
Beryllium	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40	8
Bismuth	< 0.10	0.13	0.16	< 0.10	< 0.10	ns
Cadmium	0.198	0.667	0.493	0.113	0.681	22
Chromium (total)	37.0	43.5	41.5	34.0	78.1	87
Cobalt	13.9	12.7	13.4	13.3	13.6	300
Copper	91.0	**149**	**107**	63.7	**234**	91
Iron	25900	48500	31700	25400	52500	ns
Lead	28.1	67.9	**308**	13.0	161	260
Lithium	8.8	9.0	14.2	7.5	10.6	ns
Magnesium	8290	7030	7530	11900	9210	ns
Manganese	832	841	708	494	847	ns
Mercury	0.107	0.096	6.67	0.066	0.172	24
Molybdenum	1.10	2.04	1.25	0.36	4.61	40
Nickel	26.4	36.0	33.1	28.8	46.4	89
Selenium	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	2.9
Silver	0.076	0.164	0.294	0.181	1.44	40
Strontium	52.5	122	180	30.8	76.9	ns
Thallium	0.054	< 0.050	0.070	< 0.050	< 0.050	1
Tin	2.87	6.85	6.62	2.20	8.31	300
Titanium	1190	1030	929	1480	1150	ns
Uranium	0.394	0.423	0.830	0.180	0.650	33
Vanadium	69.2	61.1	72.7	71.8	66.8	130
Zinc	82.3	**542**	202	51.7	231	360

Notes:
m - metres
mg/kg - milligrams per dry kilogram
< - less than analytical detection limit indicated
'---' - sample not analyzed for parameter indicated
ns - no standard listed
Exceeds CCME CL: CCME Canadian Environmental Quality Guidelines, Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health, Commercial

TABLE 11: GOLDER 2015 SOIL CHEMISTRY RESULTS - PETROLEUM HYDROCARBON CONSTITUENTS AND MTBE (mg/kg) (page 1 of 1)

BH ID	BH15-21	BH15-34	BH15-34	CCME CLcg
Sample ID	00918-08	00921-01	00921-02 (BFD of 00921-01)	
Date	09-Sep-2015	14-Sep-2015	14-Sep-2015	
Depth (m)	1.07 - 1.22	0.91 - 1.07	0.91 - 1.07	ns
HSVL (ppmv)	0.1	1.7	1.7	ns
Benzene	< 0.0050	0.41	0.70	0.03
Ethylbenzene	< 0.010	0.066	0.12	0.082
Toluene	< 0.020	0.23	0.47	0.37
Xylenes	< 0.040	0.11	0.31	11
Styrene	< 0.030	< 0.030	< 0.030	ns
BTEX, Total	---	---	---	ns
MTBE	< 0.10	< 0.10	< 0.10	ns
VPHs	---	---	---	ns
EPHs (C10-19)	---	---	---	ns
EPHs (C19-32)	---	---	---	ns
LEPHs	---	---	---	ns
HEPHs	---	---	---	ns
% Mass > 0.075 mm	84.8	81.8	---	ns

Notes:
m - metres
mg/kg - milligrams per kilogram
HSVL (ppmv) - headspace vapour level (parts per million by volume)
< - less than analytical detection limit indicated
'---' - sample not analyzed for parameter indicated
EPH(C10-19) standard is the CSR standard for LEPH. MOE advised (June 06, 10) that EPH(C10-19) and LEPH are equivalent for screening purposes but EPH cannot be used to demonstrate legal compliance with CSR standards
EPH(C19-32) standard is the CSR standard for HEPH. MOE advised (June 06, 10) that EPH(C19-32) and HEPH are equivalent for screening purposes but EPH cannot be used to demonstrate legal compliance with CSR standards
MTBE - methyl tert-butyl ether
VPHs - volatile petroleum hydrocarbons (C6-10), excluding benzene, ethylbenzene, toluene, xylenes
EPHs - extractable petroleum hydrocarbons
LEPHs - light extractable petroleum hydrocarbons (C10-19), excluding specific polycyclic aromatic hydrocarbon parameters
HEPHs - heavy extractable petroleum hydrocarbons (C19-32), excluding specific polycyclic aromatic hydrocarbon parameters
ns - no standard listed
Exceeds CCME CLcg: CCME Canadian Soil Quality Guidelines for BTEX, Commercial Coarse-grained Surface (10-5 incremental risk

TABLE 12: GOLDER 2015 SOIL CHEMISTRY RESULTS - PAH PARAMETERS (mg/kg) (page 1 of 2)

BH ID	BH15-21	BH15-34	BH15-34	CSR NL	CSR RLfw	CSR CLfw	CCME CLe	CCME CLi	CCME CLfl	CCME CLsc	CCME TPE
Sample ID	**00918-08**	**00921-01**	**00921-03**								
Date	**09-Sep-2015**	**14-Sep-2015**	**14-Sep-2015**								
Depth (m)	**1.07 - 1.22**	**0.91 - 1.07**	**2.44 - 2.59**								
Acenaphthene	< 0.0050	0.069	0.030	ns	ns	ns	ns	ns	0.28	ns	ns
Acenaphthylene	0.014	< 0.0050	< 0.0050	ns	ns	ns	ns	ns	320	ns	ns
Anthracene	0.024	0.099	0.013	ns	ns	ns	32	ns	ns	32	ns
Benzo(a)anthracene	0.062	0.11	< 0.020	1	1	10	ns	10	ns	ns	ns
Benzo(a)pyrene	0.037	0.057	< 0.020	1	1	10	72	ns	8800	72	ns
Benzo(b)fluoranthene	0.042	0.076	< 0.020	1	1	10	ns	10	ns	ns	ns
Benzo(g,h,i)perylene	< 0.050	< 0.050	< 0.050	ns	ns	ns	ns	ns	ns	ns	ns
Benzo(k)fluoranthene	0.021	0.038	< 0.020	1	1	10	ns	10	ns	ns	ns
Chrysene	0.067	0.15	< 0.020	ns	ns	ns	ns	ns	ns	ns	ns
Dibenz(a,h)anthracene	< 0.050	< 0.050	< 0.050	1	1	10	ns	10	ns	ns	ns
Fluoranthene	0.20	0.63	0.041	ns	ns	ns	180	ns	ns	180	ns
Fluorene	< 0.020	0.070	0.030	ns	ns	ns	ns	ns	0.25	ns	ns
Indeno(1,2,3-c,d)pyrene	< 0.050	< 0.050	< 0.050	1	1	10	ns	10	ns	ns	ns
2-Methylnaphthalene	< 0.020	0.36	0.045	ns	ns	ns	ns	ns	ns	ns	ns
Naphthalene	0.015	0.21	0.047	5	5	50	22	ns	0.013	ns	ns
Phenanthrene	0.085	0.51	0.076	5	5	50	ns	50	0.046	ns	ns
Pyrene	0.16	0.49	0.033	10	10	100	ns	100	ns	ns	ns
Benzo(a)pyrene Equivalency	< 0.10	0.11	< 0.10	ns	ns	ns	ns	ns	ns	ns	5.3

Notes:
m - metres
PAH - polycyclic aromatic hydrocarbons
mg/kg - milligrams per dry kilogram
< - less than analytical detection limit indicated
'---' - sample not analyzed for parameter indicated
ns - no standard/guideline listed
TPE - Total Potency Equivalency (1X10-5). This is only applicable in the top 1.5m

ITALICS	Exceeds CSR NL: BC Contaminated Sites Regulation, Schedule 7, Standards Triggering Contaminated Soil Relocation Agreements, Soil Relocation to Nonagricultural Land
UNDERLINED	Exceeds CSR RLfw: BC Contaminated Sites Regulation, Schedule 4, Schedule 5 (groundwater flow to surface water used by Freshwater Aquatic Life, includes mandatory site-specific factors) and/or Schedule 10, Residential
BOLD	Exceeds CSR CLfw: BC Contaminated Sites Regulation, Schedule 4, Schedule 5 (groundwater flow to surface water used by Freshwater Aquatic Life, includes mandatory site-specific factors) and/or Schedule 10, Commercial
SHADE	Exceeds CCME CLe: CCME Canadian Soil Quality Guidelines for PAH, Commercial, Environmental Health guidelines, Environmental Health
SHADE	Exceeds CCME CLi: CCME Canadian Soil Quality Guidelines for PAH, Commerical, Environmental Health guidelines, Interim Soil Quality Criteria (CCME 1991)
SHADE	Exceeds CCME CLfl: CCME Canadian Soil Quality Guidelines for PAH, Commercial, Environmental Health guidelines, Protection of Freshwater Life
SHADE	Exceeds CCME CLsc: CCME Canadian Soil Quality Guidelines for PAH, Commercial, Environmental Health guidelines, Soil Contact
SHADE	Exceeds CCME TPE: CCME Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health - TPE Calculation

TABLE 12: GOLDER 2015 SOIL CHEMISTRY RESULTS - PAH PARAMETERS (mg/kg) (page 2 of 2)

BH ID	BH15-35	BH15-36	CSR NL	CSR RLfw	CSR CLfw	CCME CLe	CCME CLi	CCME CLfl	CCME CLsc	CCME TPE
Sample ID	00921-05	00921-08								
Date	14-Sep-2015	14-Sep-2015								
Depth (m)	1.22 - 1.37	1.83 - 1.98								
Acenaphthene	0.019	0.0072	ns	ns	ns	ns	ns	0.28	ns	ns
Acenaphthylene	0.0092	< 0.0050	ns	ns	ns	ns	ns	320	ns	ns
Anthracene	0.020	0.013	ns	ns	ns	32	ns	ns	32	ns
Benzo(a)anthracene	0.023	< 0.020	1	1	10	ns	10	ns	ns	ns
Benzo(a)pyrene	< 0.020	< 0.020	1	1	10	72	ns	8800	72	ns
Benzo(b)fluoranthene	< 0.020	< 0.020	1	1	10	ns	10	ns	ns	ns
Benzo(g,h,i)perylene	< 0.050	< 0.050	ns	ns	ns	ns	ns	ns	ns	ns
Benzo(k)fluoranthene	< 0.020	< 0.020	1	1	10	ns	10	ns	ns	ns
Chrysene	0.032	0.033	ns	ns	ns	ns	ns	ns	ns	ns
Dibenz(a,h)anthracene	< 0.050	< 0.050	1	1	10	ns	10	ns	ns	ns
Fluoranthene	0.12	0.064	ns	ns	ns	180	ns	ns	180	ns
Fluorene	0.024	< 0.020	ns	ns	ns	ns	ns	0.25	ns	ns
Indeno(1,2,3-c,d)pyrene	< 0.050	< 0.050	1	1	10	ns	10	ns	ns	ns
2-Methylnaphthalene	0.025	0.021	ns	ns	ns	ns	ns	ns	ns	ns
Naphthalene	0.023	0.026	5	5	50	22	ns	0.013	ns	ns
Phenanthrene	0.12	0.071	5	5	50	ns	50	0.046	ns	ns
Pyrene	0.13	0.056	10	10	100	ns	100	ns	ns	ns
Benzo(a)pyrene Equivalency	< 0.10	< 0.10	ns	ns	ns	ns	ns	ns	ns	5.3

Notes:
m - metres
PAH - polycyclic aromatic hydrocarbons
mg/kg - milligrams per dry kilogram
< - less than analytical detection limit indicated
'---' - sample not analyzed for parameter indicated
ns - no standard/guideline listed
TPE - Total Potency Equivalency (1X10-5). This is only applicable in the top 1.5m

ITALICS	Exceeds CSR NL: BC Contaminated Sites Regulation, Schedule 7, Standards Triggering Contaminated Soil Relocation Agreements, Soil Relocation to Nonagricultural Land
UNDERLINED	Exceeds CSR RLfw: BC Contaminated Sites Regulation, Schedule 4, Schedule 5 (groundwater flow to surface water used by Freshwater Aquatic Life, includes mandatory site-specific factors) and/or Schedule 10, Residential
BOLD	Exceeds CSR CLfw: BC Contaminated Sites Regulation, Schedule 4, Schedule 5 (groundwater flow to surface water used by Freshwater Aquatic Life, includes mandatory site-specific factors) and/or Schedule 10, Commercial
SHADE	Exceeds CCME CLe: CCME Canadian Soil Quality Guidelines for PAH, Commercial, Environmental Health guidelines, Environmental Health
SHADE	Exceeds CCME CLi: CCME Canadian Soil Quality Guidelines for PAH, Commerical, Environmental Health guidelines, Interim Soil Quality Criteria (CCME 1991)
SHADE	Exceeds CCME CLfl: CCME Canadian Soil Quality Guidelines for PAH, Commercial, Environmental Health guidelines, Protection of Freshwater Life
SHADE	Exceeds CCME CLsc: CCME Canadian Soil Quality Guidelines for PAH, Commercial, Environmental Health guidelines, Soil Contact
SHADE	Exceeds CCME TPE: CCME Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health - TPE Calculation

TABLE 13: GOLDER 2015 LEACHATE CHEMISTRY RESULTS - METALS PARAMETERS (mg/L) (page 1 of 1)

BH ID	**BH15-34**	**HWR**
Sample ID	**00921-03**	
Date	**14-Sep-2015**	
Depth (m)	2.44 - 2.59	ns
pH	7.75	ns
Antimony Leachable	< 0.10	ns
Arsenic Leachable	< 0.10	2.5
Barium Leachable	0.35	100
Beryllium Leachable	< 0.10	ns
Boron Leachable	0.17	500
Cadmium Leachable	< 0.10	0.5
Chromium Leachable	< 0.10	5
Cobalt Leachable	< 0.10	ns
Copper Leachable	< 0.10	100
Iron Leachable	< 0.50	ns
Lead Leachable	< 0.10	5
Mercury Leachable	< 0.0020	0.1
Molybdenum Leachable	< 0.10	ns
Nickel Leachable	< 0.10	ns
Selenium Leachable	< 0.10	1
Silver Leachable	< 0.10	5
Thallium Leachable	< 0.10	ns
Uranium Leachable	< 0.10	10
Vanadium Leachable	< 0.10	ns
Zinc Leachable	0.14	500

Notes:
m - metres
mg/L - milligrams per liter
< - less than analytical detection limit indicated
'---' - sample not analyzed for parameter indicated
ns - no standard listed
Exceeds HWR: Table 1: Leachate Quality Standards for the New Hazardous Waste Regulation

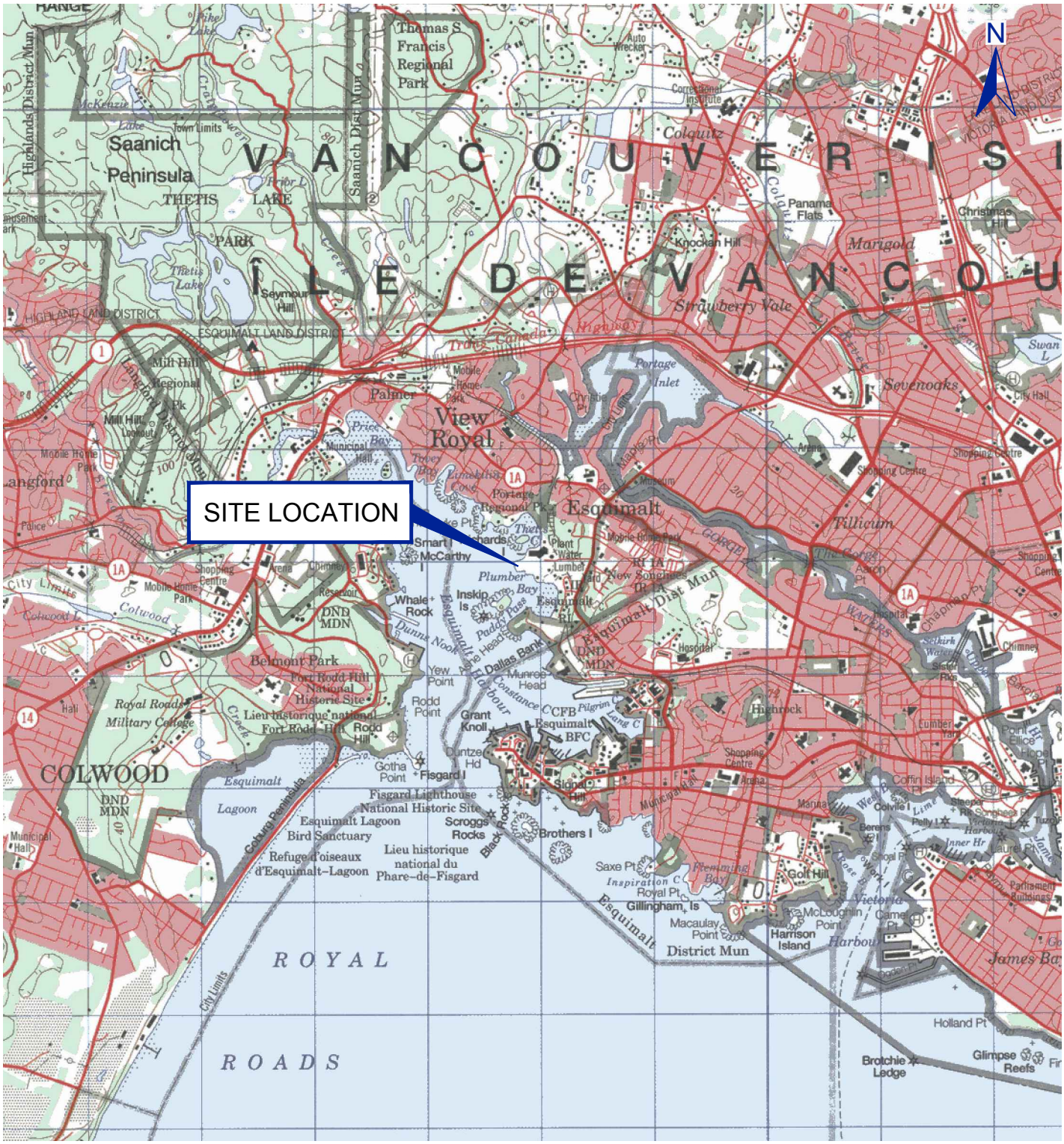
TABLE 14: GOLDER 2015 LEACHATE CHEMISTRY RESULTS - PAH PARAMETERS (mg/L) (page 1 of 1)

BH ID	BH15-34	HWR
Sample ID	00921-01	
Date	14-Sep-2015	
Depth (m)	0.91 - 1.07	ns
Acenaphthene Leachable	< 0.10	ns
Acenaphthylene Leachable	< 0.10	ns
Acridine Leachable	< 0.50	ns
Anthracene Leachable	< 0.10	ns
Benzo(a)anthracene Leachable	< 0.10	ns
Benzo(a)pyrene Leachable	< 0.10	0.001
Benzo(b&j)fluoranthene Leachable	< 0.10	ns
Benzo(g,h,i)perylene Leachable	< 0.20	ns
Benzo(k)fluoranthene Leachable	< 0.10	ns
Chrysene Leachable	< 0.10	ns
Dibenzo(a,h)anthracene Leachable	< 0.20	ns
Fluoranthene Leachable	< 0.10	ns
Fluorene Leachable	< 0.10	ns
Indeno(1,2,3-c,d)pyrene Leachable	< 0.20	ns
2-Methylnaphthalene Leachable	< 0.10	ns
Naphthalene Leachable	< 0.10	ns
Phenanthrene Leachable	< 0.10	ns
Pyrene Leachable	< 0.10	ns
Quinoline Leachable	< 0.50	ns
Total PAH Leachable	< 0.50	ns

Notes:
mg/L - milligrams per litre
PAH - polycyclic aromatic hydrocarbons
< - less than analytical detection limit indicated
'---' - sample not analyzed for parameter indicated
ns - no standard listed
Exceeds HWR: Table 1: Leachate Quality Standards for the New Hazardous Waste Regulation

APPENDIX B - DRAWINGS

Parcel 44 Western Upland Portion Remediation Specification
Esquimalt, BC
SLR Project No.: 205.03757.00000



NOTES:
REFERENCED FROM: NTS MAP 92 B/06, WSP SURVEY TAKEN JUNE 8, 2015, GOLDER ASSOCIATES DRAWINGS, FILES: 1418637-4000-05, BASE_SLR_EXCAVATION BOUNDARIES, BASE_SLR EXCAVATION SAMPLES, HISTORIC_HOLE_SLR_PWGSC, HOLE_WSP_2015, WSP_TOPO_SITE AND SITE RECONNAISSANCE INFORMATION.

IMAGERY: GOOGLE © 2012 DIGITAL BOLBE (IMAGE DATE: 2014)

0 0.5 1 2 3 km

SCALE 1:50,000
WHEN PLOTTED CORRECTLY ON A 8.5 x 11 PAGE LAYOUT
NAD 1983 UTM Zone 10N

THIS DRAWING IS FOR CONCEPTUAL PURPOSES ONLY. ACTUAL LOCATIONS MAY VARY AND NOT ALL STRUCTURES ARE SHOWN.

SLR
global environmental solutions

PUBLIC WORKS AND GOVERNMENT SERVICES
PARCEL 44
ESQUIMALT, BC

PARCEL 44 WESTERN UPLAND PORTION
REMEDIATION SPECIFICATION

SITE LOCATION MAP

Date: November 25, 2015
Project No. 205.03757.00000

Drawing No. 1

Cadfile name: S_205-03757-00000-A1.dwg

NOTES:
REFERENCED FROM: NTS MAP 92 B/06, WSP SURVEY TAKEN JUNE 8, 2015, GOLDER ASSOCIATES DRAWINGS, FILES: 1418637-4000-05, BASE_SLR_EXCAVATION BOUNDARIES, BASE_SLR EXCAVATION SAMPLES, HISTORIC_HOLE_SLR_PWGSC, HOLE_WSP_2015, WSP_TOPO_SITE AND SITE RECONNAISSANCE INFORMATION.

IMAGERY: GOOGLE © 2012 DIGITAL GLOBE (IMAGE DATE: 2014)

LEGEND:

- ESQUIMALT NATION RESERVE BOUNDARY
- PARCEL 44 SITE BOUNDARY
- PROPOSED SOIL STOCKPILE AREAS

UTILITIES AND SYMBOLS
PP ○ POWER POLE

0 10 20 40 60 80 m

SCALE 1:1,250
WHEN PLOTTED CORRECTLY ON A 11 x 17 PAGE LAYOUT
NAD 1983 UTM Zone 10N

THIS DRAWING IS FOR CONCEPTUAL PURPOSES ONLY. ACTUAL LOCATIONS MAY VARY AND NOT ALL STRUCTURES ARE SHOWN.

PUBLIC WORKS AND GOVERNMENT SERVICES
PARCEL 44
ESQUIMALT, BC

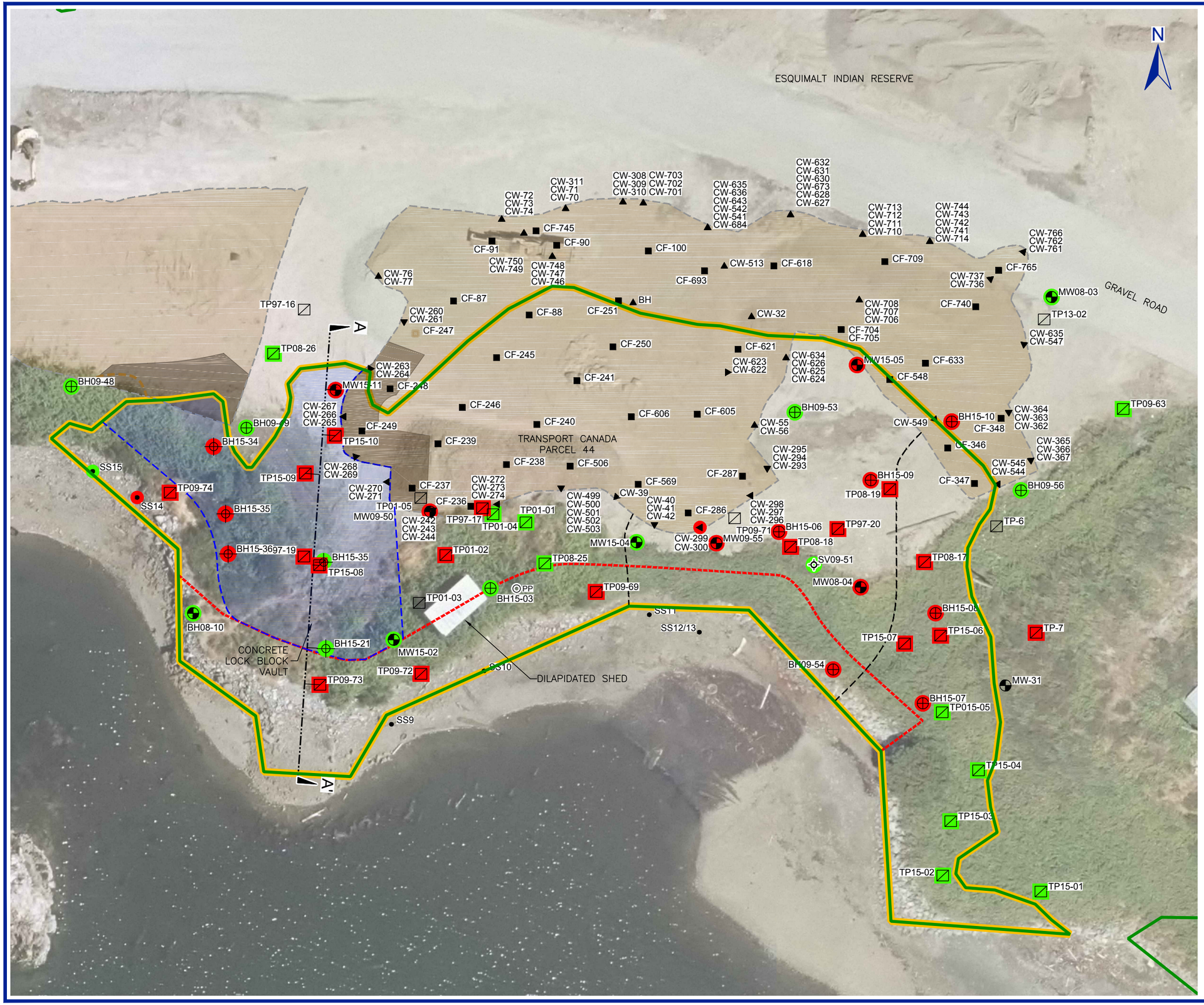
PARCEL 44 WESTERN UPLAND PORTION
REMEDIATION SPECIFICATION

SITE PLAN AND SURROUNDING LAND USE

Date: November 25, 2015
Project No. 205.03757.00000
Drawing No. 2

SLR global environmental solutions

Cadfile name: S_205-03757-00000-A1.dwg



NOTES:
REFERENCED FROM: NTS MAP 92 B/06, WSP SURVEY TAKEN JUNE 8, 2015, GOLDER ASSOCIATES DRAWINGS, FILES: 1418637-4000-05, BASE_SLR_EXCAVATION BOUNDARIES, BASE_SLR EXCAVATION SAMPLES, HISTORIC_HOLE_SLR_PWGSC, HOLE_WSP_2015, WSP_TOPO_SITE AND SITE RECONNAISSANCE INFORMATION.

IMAGERY: DND ORTHOPHOTO 79-71 AND 80-71 (IMAGE DATE: 2014)

LEGEND:

- ESQUIMALT NATION RESERVE BOUNDARY
- PARCEL 44 SITE BOUNDARY
- BOUNDARY OF UPLAND PORTION OF SITE
- LIMITS OF PREVIOUS REMEDIAL EXCAVATION
- IMPORTED SAND BACKFILL
- LIMITS OF PROPOSED REMEDIAL EXCAVATION
- APPROXIMATE EXTENT OF SAND BACKFILL PLACED DURING PREVIOUS REMEDIATION THAT WILL REQUIRE EXCAVATION, TEMPORARY STOCKPILING AND REPLACEMENT
- BOREHOLE LOCATION
- BOREHOLE LOCATION (OTHERS)
- BOREHOLE LOCATION COMPLETED AS A MONITORING WELL
- TEST PIT LOCATION
- SOIL VAPOUR WELL LOCATION
- SOIL SAMPLE LOCATION
- SOIL SAMPLE, WALL
- SOIL SAMPLE, BASE
- A A' CROSS SECTION A-A' (REFER TO DRAWING 4)

UTILITIES AND SYMBOLS
POWER POLE
PP

SOIL LABORATORY ANALYSIS RESULTS
CONCENTRATIONS LESS THAN OR EQUAL TO APPLICABLE CCME CL GUIDELINES

CONCENTRATION(S) GREATER THAN APPLICABLE CCME CL GUIDELINES

0 5 10 20 30 m

SCALE 1:500
WHEN PLOTTED CORRECTLY ON A 11 x 17 PAGE LAYOUT
NAD 1983 UTM Zone 10N

THIS DRAWING IS FOR CONCEPTUAL PURPOSES ONLY. ACTUAL LOCATIONS MAY VARY AND NOT ALL STRUCTURES ARE SHOWN.

PUBLIC WORKS AND GOVERNMENT SERVICES
PARCEL 44
ESQUIMALT, BC

PARCEL 44 WESTERN UPLAND PORTION REMEDIATION SPECIFICATION

SUMMARY OF SOIL CONTAMINATION AND PROPOSED REMEDIAL EXCAVATION AREA

Date: November 25, 2015
Project No. 205.03757.00000
Drawing No. 3

SLR global environmental solutions

Cadfile name: S_205-03757-00000-A1.dwg

A
NORTH

A'
SOUTH

MW15-11
3.99 m

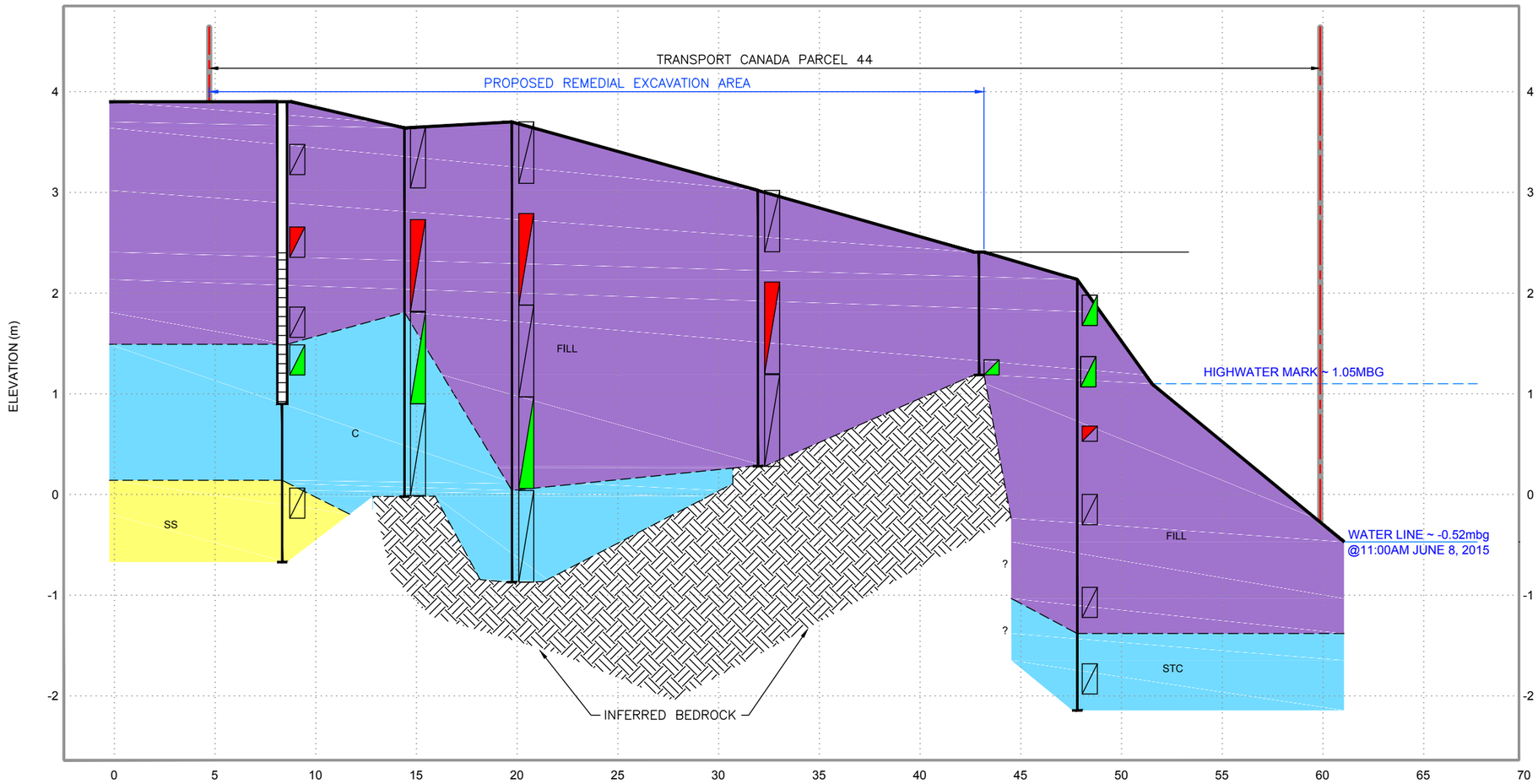
TP15-10
3.64 m

TP15-09
3.70 m

TP15-08
3.02 m

BH15-21

TP09-73



NOTES:
REFERENCED FROM: NTS MAP 92 B/06, WSP SURVEY TAKEN JUNE 8, 2015, GOLDER ASSOCIATES DRAWINGS, FILES: 1418637-4000-05, BASE_SLR_EXCAVATION BOUNDARIES, BASE_SLR EXCAVATION SAMPLES, HISTORIC_HOLE_SLR_PWGSC, HOLE_WSP_2015, WSP_TOPO_SITE AND SITE RECONNAISSANCE INFORMATION.

IMAGERY: GOOGLE © 2012 DIGITAL GLOBE (IMAGE DATE: 2014)

LEGEND:

- SITE BOUNDARY
- BOREHOLE LOCATION (OTHERS)
- BOREHOLE LOCATION COMPLETED AS A MONITORING WELL
- TEST PIT LOCATION
- WATER LEVEL (DATE)
- SOIL SAMPLE LOCATION
- CONCENTRATIONS LESS THAN OR EQUAL TO THE APPLICABLE CCME CL GUIDELINES
- CONCENTRATIONS GREATER THAN THE APPLICABLE CCME CL GUIDELINES
- FILL — FILL
- STC — SILT AND CLAY
- C — CLAY
- BR — BEDROCK
- SS — SANDY SILT

- WELL
- SCREENED INTERVAL
- BOREHOLE OR TESTPIT
- END OF HOLE

THIS DRAWING IS FOR CONCEPTUAL PURPOSES ONLY. ACTUAL LOCATIONS MAY VARY AND NOT ALL STRUCTURES ARE SHOWN.

0 0.5 1 2 3 m
VERTICAL SCALE 1:50

0 2.5 5 10 15 m
HORIZONTAL SCALE 1:250
WHEN PLOTTED CORRECTLY ON A 11 x 17 PAGE LAYOUT

PUBLIC WORKS AND GOVERNMENT SERVICES
PARCEL 44
ESQUIMALT, BC

PARCEL 44 WESTERN UPLAND PORTION
REMEDIATION SPECIFICATION

CROSS SECTION A-A'

Date: November 25, 2015

Project No. 205.03757.00000

Drawing No. 4

SLR global environmental solutions

Cadfile name: S_205-03757-00000-A1.dwg

APPENDIX C - PHOTOGRAPHS

Parcel 44 Western Upland Portion Remediation Specification
Esquimalt, BC
SLR Project No.: 205.03757.00000

Photograph 1: Western upland portion of Parcel 44, facing southeast.

Photograph 2: View of the central part of the Parcel 44 site, looking west.

Photograph 3: Western upland portion of Parcel 44, facing southeast.

Photograph 4: View of the interior of the wooden shed.

Photograph 5: Concrete lock block vault, looking southwest.

Photograph 6: View of pile of mixed brush for segregation and off-site disposal.

Photograph 7: View of pile of mixed brush for segregation and off-site disposal, and riprap for segregation and placed along the perimeter to restrict site access.

Photograph 8: View of metal tank (approximately 1,000 L) partially filled with water for off-site disposal.